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## Upgrading or Polarisation? Long-Term and Global Shifts in the Employment Structure: European Jobs Monitor 2015

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## Upgrading or Polarisation? Long-Term and Global Shifts in the Employment Structure: European Jobs Monitor 2015

### Abstract

[Excerpt] Europe has begun to emerge from the prolonged slump that began with the global financial crisis in 2008 and was deepened by the euro zone single-currency crisis in 2010 –2011. In the last year, aggregate employment levels have risen faster than at any time since 2008. Aggregate EU unemployment rates have been declining since September 2013.

This, the fourth annual European Jobs Monitor report, looks in more detail at shifts in employment at Member State and aggregate EU level between the second quarter (Q2) of 2011 and 2014 Q2. A 'jobs-based' approach is applied in order to describe employment shifts quantitatively (how many jobs were created or destroyed) and qualitatively (what kinds of jobs these were). This approach has been used, in particular, to assess the extent to which employment structures in developed economies are polarising, due to the decline in mid-paid jobs, or upgrading as a result of growth in high-paid, high-skilled jobs.

The report examines the time profile of recent shifts in the employment structure, as it appears that the re-emergence of employment growth has coincided with a transition from the more polarised employment shifts of the peak recession years to a flatter, more equal distribution of employment across the wage distribution, with, if anything, a downward skew – in other words, greater growth in lower-paid employment. This raises the spectre of growing low-productivity employment, where output and, ultimately, living standards fail to rise despite an increase in job opportunities.

The report also synthesises the main findings from two other analyses of labour market developments that use a jobs-based approach. The first centres on developments in six European countries – Germany, Spain, the UK, Sweden, Ireland and Switzerland – since the 1970s. The second is recent work by a network of labour market researchers from outside Europe, which focuses on Australia, China, Japan, Russia, South Korea and the US.

### Keywords

Europe, employment levels, employment structure, wage distribution, labor market

### Comments

#### Suggested Citation

European Foundation for the Improvement of Living and Working Conditions. (2015). *Upgrading or polarisation? Long-term and global shifts in the employment structure*. Luxembourg: Publications Office of the European Union.

# Upgrading or polarisation? Long-term and global shifts in the employment structure: European Jobs Monitor 2015







# Upgrading or polarisation? Long-term and global shifts in the employment structure

## European Jobs Monitor 2015

**When citing this report, please use the following wording:**

Eurofound (2015), *Upgrading or polarisation? Long-term and global shifts in the employment structure: European Jobs Monitor 2015*, Publications Office of the European Union, Luxembourg.

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**Research project:** European Jobs Monitor

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Cataloguing data can be found at the end of this publication.

Luxembourg: Publications Office of the European Union, 2015

ISBN 978-92-897-1380-1

doi:10.2806/473689

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# Executive summary

## Introduction

Europe has begun to emerge from the prolonged slump that began with the global financial crisis in 2008 and was deepened by the euro zone single-currency crisis in 2010–2011. In the last year, aggregate employment levels have risen faster than at any time since 2008. Aggregate EU unemployment rates have been declining since September 2013.

This, the fourth annual European Jobs Monitor report, looks in more detail at shifts in employment at Member State and aggregate EU level between the second quarter (Q2) of 2011 and 2014 Q2. A ‘jobs-based’ approach is applied in order to describe employment shifts quantitatively (how many jobs were created or destroyed) and qualitatively (what kinds of jobs these were). This approach has been used, in particular, to assess the extent to which employment structures in developed economies are polarising, due to the decline in mid-paid jobs, or upgrading as a result of growth in high-paid, high-skilled jobs.

The report examines the time profile of recent shifts in the employment structure, as it appears that the re-emergence of employment growth has coincided with a transition from the more polarised employment shifts of the peak recession years to a flatter, more equal distribution of employment across the wage distribution, with, if anything, a downward skew – in other words, greater growth in lower-paid employment. This raises the spectre of growing low-productivity employment, where output and, ultimately, living standards fail to rise despite an increase in job opportunities.

The report also synthesises the main findings from two other analyses of labour market developments that use a jobs-based approach. The first centres on developments in six European countries – Germany, Spain, the UK, Sweden, Ireland and Switzerland – since the 1970s. The second is recent work by a network of labour market researchers from outside Europe, which focuses on Australia, China, Japan, Russia, South Korea and the US.

## Policy context

The EU’s Europe 2020 strategy for smart, sustainable and inclusive growth includes a commitment to fostering high levels of employment and productivity. This implies a renewed focus on the goal of ‘more and better jobs’ in the earlier Lisbon agenda. More jobs are needed to address the problem of lengthening unemployment queues. But Europe also needs better, more productive jobs if it is to increase living standards for its citizens in an expanding, integrated global economy.

The European Commission’s 2012 Employment Package (“Towards a job-rich recovery”) identifies some sectors in which employment growth is considered most likely – health services, information and communication technologies, personal and household services, as well as the promising, if hard to define, category of ‘green jobs’. This report provides up-to-date data about employment levels and job quality in growing, and declining, sectors and occupations.

## Key findings

### Employment shifts in the EU, 2011–2014

Over the three-year period 2011 Q2–2014 Q2, employment growth in the EU was asymmetrically polarised, with the greatest growth in well-paid jobs, some modest growth in the lowest-paid jobs and declining employment in jobs in the middle of the wage distribution. There is a variety of patterns of employment shifts at Member State level, with most countries exhibiting either upgrading

or polarising shifts, but with a significant minority also downgrading (showing greater growth in lower-paid employment).

Employment levels in the EU have started to rise again since 2013 Q2, with net employment some 1.8 million higher in 2014 Q2. Nonetheless, aggregate EU employment levels are still some four million lower than at the outset of the crisis six years ago.

Employment growth has strengthened, particularly in low-to-mid-paid jobs. Throughout the crisis and its immediate aftermath (2008–2013), employment grew only in jobs accounting for the highest-paid 20% of workers. As the recovery has become more established, lower-paid services jobs have accounted for a large share of recent growth.

Strong recent growth in the part-time share of employment has been the main cause of the trend of destandardisation in employment relationships. When jobs in the EU are classified into five categories of equal size (quintiles) based on wage, it is apparent that growth in permanent, full-time employment is increasingly confined to top-quintile, well-paid jobs; in all other quintiles of the wage distribution, it is decreasing.

#### **Employment structure shifts: European comparison**

The analysis of six European countries over more than four decades showed a surprising consistency in the overall patterns of structural change despite some short-term diversity and a few exceptions. Employment structures in Germany and the UK have been polarising since the early 1980s, whereas in Ireland, Spain, Sweden and Switzerland they have been more-or-less consistently upgrading since the 1970s (with some periods of sharp polarisation in recessions in Spain, and also in the 1980s in Ireland and Switzerland).

This diversity across countries took place against a background of very similar broad trends of structural change in the long run. Deindustrialisation tended to have similarly polarising effects everywhere (destroying employment in mid-paid jobs), but the overall patterns of structural change were determined to a greater extent by developments in the more dynamic service sector, which were more country-specific. The expansion of public sector employment, for instance, was generally linked to the growth of relatively high-paid occupations, but in the UK it also expanded the bottom quintiles after 1990, contributing to polarisation.

Although the analysis of longer-term developments uncovered a significant and consistent diversity across countries, it also showed some very important common trends. Most importantly, there was a consistent expansion of employment in high-paid jobs across countries and periods, contrasting with a very significant decrease in mid-paid and low-paid occupations across countries and periods.

#### **Employment structure shifts: Global comparison**

In the global comparison, two broadly similar patterns of employment shifts were apparent:

- the EU, Japan and the US showed polarised upgrading, with the greatest employment growth in well-paid jobs, plus a relative contraction of mid-paid jobs and some modest relative growth in low-paid jobs;
- Australia, China, Russia and South Korea showed upgrading, with the greatest employment growth in well-paid jobs and lowest employment growth in low-paid jobs.

Recessions or periods of slowing growth were associated with more polarised employment shifts. The clearest examples of upgrading growth tended to be in economies experiencing higher output growth.

China was unique in the scale of its workforce and its pace of growth (in terms of output and employment). Employment grew by eight million each year, comparable to total employment growth in the EU for 2004–2013. Over the five-year period 2005–2010, over 50 million agriculture jobs were lost, but this was more than compensated for by net growth in employment in the manufacturing, construction and retail sectors, the results of a huge (but slowing) migration from rural China to the growing cities.



# Introduction

This report describes recent structural shifts in employment in European labour markets primarily in the period 2011–2014, using a jobs-based approach. It also summarises the work of two other projects that use a similar approach. The first of these examines longer-term shifts in employment structure in six European countries. The second looks at more recent shifts, from the 1990s and 2000s onwards, in a selection of ‘BRICs’<sup>1</sup> countries – China and the Russian Federation – and developed countries – Australia, Japan, South Korea and the United States.

The jobs-based methodology allows the identification of how net employment shifts at country and aggregate EU level have been distributed across jobs in different quintiles of the wage distribution. In this analysis, a job is understood as a given occupation in a given sector, for example a teaching professional in the education sector or a sales worker in retail. The analysis breaks down employment into jobs so defined and then ranks them in terms of their job quality. The principal criterion for ranking jobs is the wage, although alternative job rankings based on the average educational level of job-holders and a multidimensional measure of non-pecuniary job quality have also been developed (see Eurofound, 2013, for details on construction of these alternative indices). A simple graphical representation of observed employment shifts in terms of wage (or education or job quality) quintiles shows whether recent employment growth is stronger at the top, middle or bottom of the job distribution and how it is distributed by gender, age, employment or professional status.

## Labour market context

Aggregate labour market performance in Europe in mid-2014 remained problematic despite recent positive employment growth and declining unemployment levels for over 12 months. Unemployment was still very high at over 10% (and 11.5% in the euro zone Member States) and significantly higher than in the main comparator countries, Japan and the US (3.6% and 5.9% in November 2014, respectively). Employment levels were still some four million lower than at the outset of the crisis six years before, and over eight million more people were unemployed (24 million as opposed to 16 million). Labour market performance like this is more-or-less unprecedented in recent European history, where recessions have generally been marked by slowing employment growth rather than net employment destruction. Europe’s economies and labour markets are still very much within the gravitational pull of the global financial crisis and the euro zone crisis that followed it.

It is prudent, therefore, not to be over-confident about the modest employment bounce since mid-2013. A legacy of sovereign and private debt arising from the crises and the policies implemented to address these deficits will continue to impede growth. An additional concern has been below-trend structural growth forecasts in the developed world as a whole in line with predictions of ‘secular stagnation’. Even with minimally positive or negative real interest rates for much of the last six years, growth forecasts for the euro zone remain rooted around the 0.5%–1.5% level (IMF, 2014), significantly lower than the long-run 2% annual growth achieved previously with a much less accommodating monetary policy. Forecast growth for 2015 is also a full percentage point lower in the euro zone (1.3%) compared with that of the advanced economies as a whole.

Additional unconventional monetary policy tools – ‘quantitative easing’ – have been used in Japan, the UK and the US in recent years, and the ECB sanctioned their deployment prior to this report being finalised. They appear to have had a positive differential impact on growth rates at the expense of weakened exchange rates. Superficially, in terms of falling unemployment rates, Japan and the US have also fared better than Europe, although in the case of the US a sharp decline in the number of

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<sup>1</sup> An acronym referring to four countries with rapidly developing economies: Brazil, Russia, India and China.

people active in the labour market means that the unemployment rate is an unreliable guide to the health of the US labour market. The employment rate – the share of the working age population in employment – has declined by nearly five percentage points in the US since 2007. Coincidentally, the employment rate has increased by around five percentage points in Germany in the same period while declining very marginally (by around one percentage point) in the EU as a whole.

Employment levels in the EU increased by some 1.8 million between the second quarter (Q2) of 2013 and 2014 Q2.<sup>2</sup> Within the EU, there remains a large variation in national labour market performances, although differentials have tended to shrink in the last year as some of the economies most affected by the crisis – Ireland, Portugal and Spain – have enjoyed faster growth than countries where the economy and labour markets remained more resilient. Employment levels increased by similar amounts between 2013 Q2 and 2014 Q2 in Germany (103,000) and in Portugal (90,000), notwithstanding big differences in labour market size. In Spain, there was an increase of nearly 200,000 jobs. These are minor turnarounds given the scale of recent employment destruction – 3.3 million fewer people are employed in Spain now compared with six years ago – but they suggest that the period of sharpening divergence in EU national labour markets is coming to an end.

Only four countries experienced a contraction in employment between 2013 Q2 and 2014 Q2. The declines were marginal in the cases of Belgium and Italy but more significant in the cases of Estonia and the Netherlands (accounting for about 1% of each country's employment).

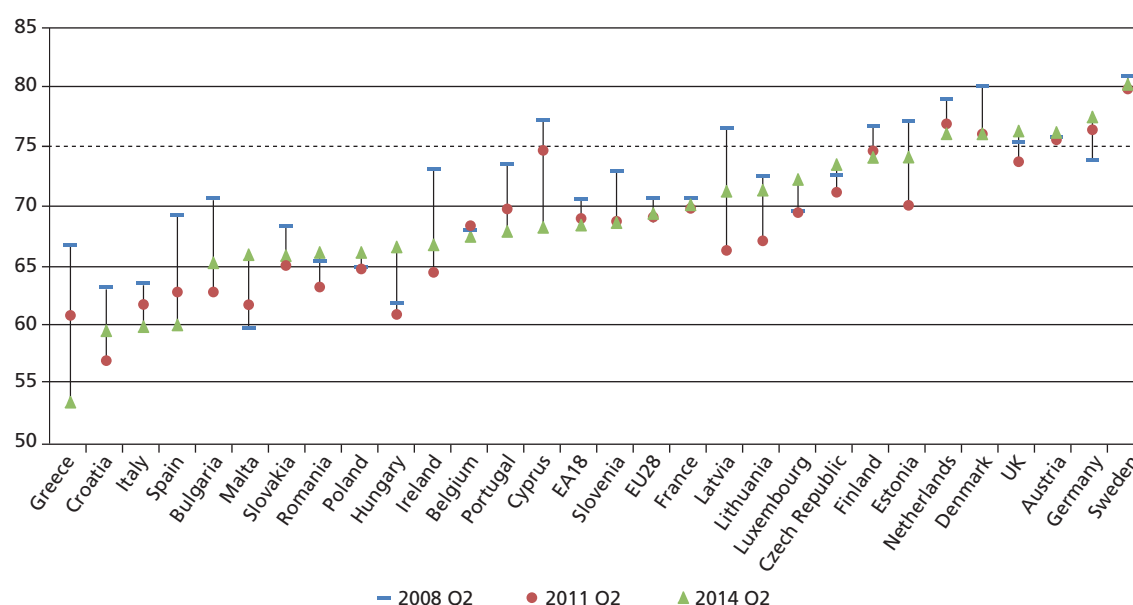
By some margin, the most important contribution to employment growth in the EU came from the UK, which accounted for over 800,000 net new jobs over the 12-month period. Two other non-euro-zone countries – Poland and Hungary – were among those with the highest net (and relative) employment growth, recording 263,000 and 190,000 new jobs, respectively.

The Europe 2020 strategy has an overarching employment objective of a 75% employment rate amongst those aged 20–64.<sup>3</sup> As Figure 1 highlights, the recession and its aftermath have set back progress towards this target. The overall EU employment rate declined from 70.5% in 2008 Q2 to 68.8% in 2011 Q2 but increased to 69.3% in the subsequent three years.

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<sup>2</sup> According to EU-LFS data, the increase was just over 1.2 million. This, however, does not take account of a very significant break in the Romanian data in 2013–2014, apparently based on census revisions. An adjustment is made in this report to take account of the more likely real employment shifts in Romania. The practical impact of this is to reduce estimates of total employment in Romania for all quarters prior to 2014 by about 600,000. This, therefore, raises the estimate of net employment growth in Romania and in the EU as a whole.

<sup>3</sup> Within the Europe 2020 framework, each Member State, with the exception of the UK, has set its own employment rate target or target range for 2020. These range from 62.9% in the case of Malta to 'well over 80%' in the case of Sweden.

**Figure 1: EU28 employment rates (%) for 20–64-year-olds, 2008 Q2–2014 Q2**

Note: EA18 = 18 euro zone Member States

Source: EU-LFS

Six 'older' Member States – Austria, Denmark, Germany, the Netherlands, Sweden and the UK – are already above the 75% target level. Of the remaining countries, 18 are within 10 percentage points of the target rate and 4 Mediterranean Member States – Croatia, Greece, Italy and Spain – are at least 15 percentage points below the target rate.

Nearly all net employment growth has occurred in the service sector of the economy, notably the health, professional services, and hotel and restaurants sectors. The engine of growth in services employment has tended to shift from public services to private services, a predictable consequence of public spending cuts, whose impact can be seen clearly in the reduction of public administration employment levels by 400,000 (over 2.5%) since 2011.

There was a modest increase in manufacturing employment between 2013 Q2 and 2014 Q2 (up just over 400,000), but this comes after previous losses of nearly 5 million jobs between 2008 and 2013. The construction sector – probably the most cyclical of sectors in employment terms – continues to shed employment. A further 200,000 jobs in the sector were lost between 2013 Q2 and 2014 Q2, on top of the 3.5 million lost in the preceding five years.

Both manufacturing and construction continue to be male-dominated sectors, with low-to-medium average education levels. The disproportionate impact of the crisis on these sectors has meant that male, blue-collar workers were especially hard hit, notably during its early years.

The employment of younger workers has been affected in particular by reduced hiring levels and probably exacerbated by the increased likelihood of older workers working up to and beyond 65 years of age. The fastest-growing five-year age cohorts in employment in relative terms are those aged 60–64 and 65–69. The number of people aged over 60 in the EU workforce has increased by more than 2.4 million since 2011. A higher employment rate for older workers is no longer a specific, strategic EU employment objective, but it has been climbing throughout the crisis. The

50% employment rate target for 55–64-year-olds set in the Lisbon agenda, and not achieved within the original 2000–2010 time frame, was finally achieved in 2013 Q2 and had risen further to 51.7% by 2014 Q2. Overall, those in higher-skilled occupations, especially core-age and older workers with longer tenure have continued to experience much more benign labour market outcomes than their younger, lower- and medium-skilled counterparts, on whom the employment consequences of the crises have fallen hardest.

### **Jobs-based approach: Methodology**

The approach in this chapter is to focus on how the structure of employment in Europe has changed in the most recent three years (2011 Q2–2014 Q2).<sup>4</sup> In order to do this, the ‘job’ is taken as the unit of analysis. Increasingly, EU employment policy is phrased in terms of ‘jobs’. ‘More and better jobs’ was the headline phrase of the Lisbon agenda, and the ‘New skills for new jobs’ initiative is central to its successor, Europe 2020.

A job here is defined as an occupation in a sector. This is an intuitively attractive definition and corresponds to what people think of when describing their job, or to how an employer advertises a new job opening – an administrator in the insurance industry, a doctor in the health sector.

This definition is useful for both theoretical and empirical reasons. The two concepts of occupation and sector correspond to two fundamental dimensions of the division of labour within and across organisations. The sector classification designates the horizontal distribution of economic activities across organisations generating different products and services. The occupation classification provides an implicit hierarchy of within-organisation roles – senior managers, line managers, professionals, associate professionals, production staff and so on. Established international classifications of occupation (ISCO, the International Standard Classification of Occupations) and sector (NACE, Nomenclature statistique des activités économiques dans la Communauté européenne) mean that it is relatively easy to operationalise the jobs-based approach using the standard labour market data sources, such as the EU Labour Force Survey (EU-LFS), with a good level of international comparability.

The jobs-based approach requires not only the definition of a job in an intuitive, conceptually coherent and empirically practical way but also some means of evaluating these jobs in relation to their quality. The job-wage has been the main proxy of job quality in much jobs-based analysis, originating in the work of Nobel Laureate Joseph Stiglitz in the 1990s and subsequently refined by Erik Olin Wright and Rachel Dwyer and others. The analysis that follows relies mainly on a wage-based measure to rank jobs.

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<sup>4</sup> In the analysis that follows, the time frame used is 2011 Q2–2014 Q2. Occasionally, shorthand reference in the text is made to 2011–2014 and 2013–2014, but in all cases it is based on second-quarter data from the relevant year.



### Methodological note on the jobs-based approach

The main, simplified steps of the jobs-based approach are as follows:

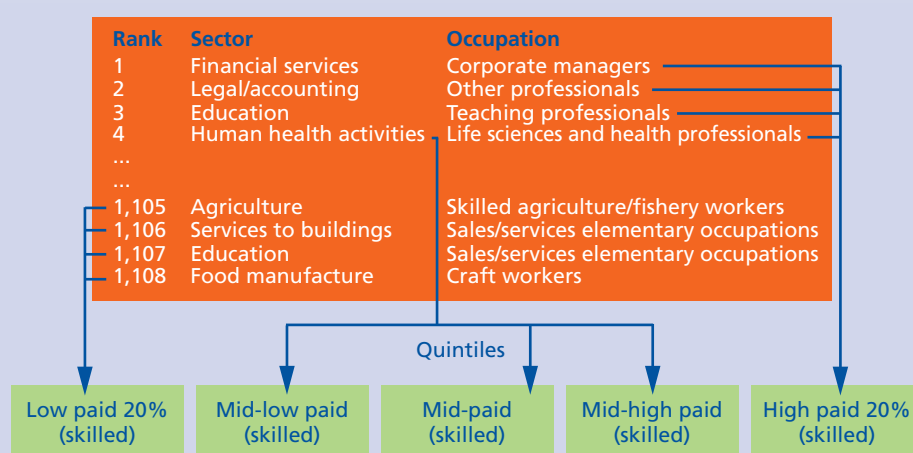
1. Using the standard international classifications of occupation (ISCO-08) and sector (NACE Rev. 2.0) at two-digit level, a matrix of jobs is created in each country. Each job is an occupation in a sector. In total, there are 43 two-digit occupations and 88 two-digit sectors, which generates 3,784 job cells. In practice, many of the theoretical job cells do not contain employment; there are unlikely to be any skilled agricultural workers in financial services, for example. The country total of job cells with employment varies between around 400 and just over 2,000 and is largely determined by country size and labour force survey sample size.

2. The jobs in each country are ranked, based on some ranking criterion, mainly the mean hourly wage. The job-wage rankings for each country used in this report are based on combining data from the EU-LFS annual data files for 2011–2013 and aggregated data from the Structure of Earning Survey (SES) for 2010.<sup>5</sup> These sources allowed the creation of country job-wage rankings for 28 Member States.

3. Jobs were allocated to quintiles in each country based on the job-wage ranking for that country. The best-paid jobs are assigned to quintile 5, the lowest-paid to quintile 1. Each quintile in each country should represent as close as possible to 20% of employment in the starting period. Hereafter, the job-to-quintile assignments remain fixed for each country. The focus then is shifted to the EU-LFS employment data and the change in the stock of employment at quintile level in each country in 2013 Q2–2014 Q2 (or 2011 Q2–2014 Q2).

Figure 2 illustrates in simplified format the three steps outlined above, using some of the top-paid and lowest-paid jobs that employ large numbers at EU level as examples. (While the jobs are correctly assigned in terms of EU quintile, the individual job-wage ranks, 1–4 and 1,105–1,108, are for illustrative purposes only.)

**Figure 2: Job rankings and quintile assignments carried out for each country**

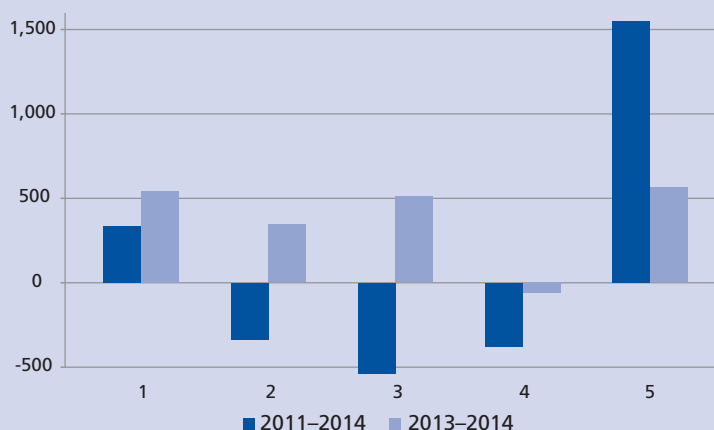


<sup>5</sup> Because the job-wage (and education) rankings have been recalculated using more recent years of EU-LFS data, there are some differences in results reported in this annual report and those in previous reports. In nearly all cases, the differences are minor.

4. Net employment change between starting and concluding periods (in persons employed) for each quintile in each country is summed to establish whether net job growth has been concentrated in the top, middle or bottom of the employment structure. This generates a series of charts similar to Figure 3. Except where otherwise indicated, all charts in the report describe net employment change by quintile for the indicated country or for the EU as a whole. The EU aggregate charts are based on applying a common EU job-wage ranking.

The resulting quintile charts give a simple, graphical representation of the extent of employment change in a given period, as well as an indication of how that change has been distributed across jobs of different pay. (A similar classification of jobs can be done using job-holders' skills or job quality more broadly defined as a ranking criterion.) Figure 3, for example, illustrates employment change for the EU28 during 2011 Q2–2014 Q2 using the job-wage quintiles. The pale blue bars show the change in the most recent 12 months, while the dark blue bars show the changes over the full three-year period. The figure should be read from the leftmost bar cluster (quintile 1, representing the lowest-paid jobs) to the rightmost cluster (quintile 5, representing highest-paid jobs). Net employment change is represented on the vertical axis, generally in thousands but sometimes as an annual percentage change. The fact that the 2011–2014 bars are below zero for the three middle quintiles indicates that there was net job destruction in the jobs assigned to these quintiles over the three-year period.

**Figure 3: Net employment change (in thousands) by job-wage quintile, EU, 2011 Q2–2014 Q2**



Note: EU28 data; Q2 data in each year.

Source: EU-LFS (authors' calculations)

This method also offers further possibilities of breaking down these net employment changes by such categories as gender, employment or professional status, working time category (full time or part time), which are used later in this chapter. For a more extensive description of the data-processing involved, please refer to Annex 1. Further background documentation includes Eurofound (2008b), as well as extensive material in the annexes of previous European Jobs Monitor (EJM) annual reports, where the same jobs approach was used – see Eurofound (2008a, 2011, 2013, 2014).

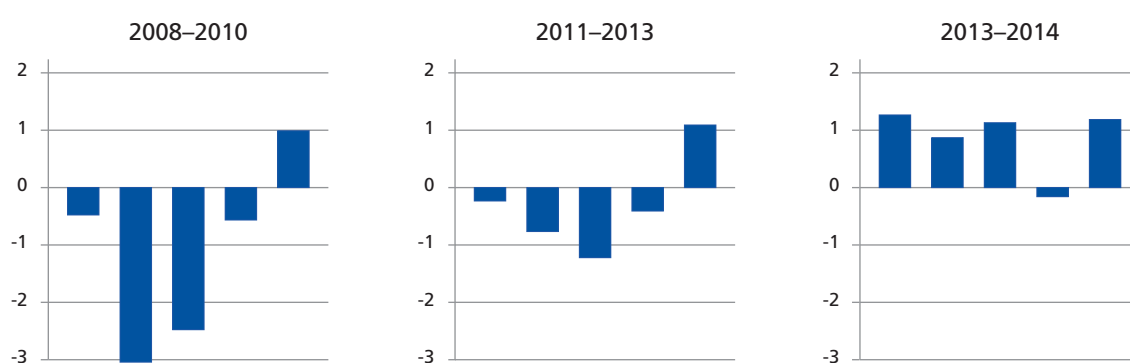
# Employment shifts in the EU, 2011–2014

This chapter uses the jobs approach to describe employment developments by job-wage quintile during the period 2011 Q2–2014 Q2. Overall trends in the EU are looked at first, with the varying patterns of change in the individual Member States then described. Thereafter, employment change is broken down into its components in terms of major sectoral aggregations, worker characteristics (gender and age) and employment characteristics (full-time or part-time, temporary or permanent contract). The objective is to show how the broad outlines of employment change identified in the quintile charts intersect with other dimensions of labour market development, such as the rapid recent growth in part-time work, the increasing share of female employment and the increasing share of services in total employment.

The three-year period between 2011 Q2 and 2014 Q2 included the ‘double-dip’ recession in which some 1.3 million job losses were added to the 5 million previously lost during the global financial crisis period (2008–2010). The most recent year has seen some significant employment growth, with approximately 1.8 million net new jobs created in the EU in the 12 months to 2014 Q2.

The sign of the employment shifts has changed therefore – from negative to positive – but the nature, or quality, of the shifts also appears to have changed. Since 2008, successive EJM annual reports have demonstrated that recessionary job destruction was concentrated in the middle and mid-low wage quintiles, notably as a result of the disproportionate share of job losses in the manufacturing and construction sectors (Figure 4). These are sectors in which employment is predominantly in mid-paid jobs. Employment continued to grow in well-paid, high-skilled jobs in the top quintile throughout 2008–2013, albeit at a more modest pace than in the long period of employment expansion that preceded the 2008 global crisis. Bottom-quintile employment also tended to be more resilient than that in the middle quintiles, suffering relatively modest losses. The most recent data represents something of a break from this pattern.

**Figure 4: Employment change (% per annum) by job-wage quintile, EU27, 2008 Q2–2014 Q2**



Note: EU27, omitting Croatia for comparability.

Source: EU-LFS, SES (author's calculations)

The pattern of employment growth in 2013 Q2–2014 Q2 is quite distinct from the asymmetrical polarisation of the earlier two periods. Perhaps the most interesting feature is that the largest share of the net new employment created since 2013 Q2 has been in the bottom three job-wage quintiles.

Various explanations can be offered for this new pattern. It could be that there has been a bounce in employment in those jobs or quintiles most affected by the two waves of recession experienced in recent years; in other words, there has been a recovery or replacement of jobs previously destroyed as market conditions improve.

A second, related explanation could be that the resumption of something approaching a trend of 1% annual employment growth has been achieved, mainly through the creation of lower-quality jobs. This would be consistent with healthier levels of employment growth, alongside low levels of output growth and continuing wage stagnation in many Member States.

These points will be drawn out with reference to individual countries and using data covering shifts over 2011–2014 in order to see to what extent patterns observed in the EU aggregate data are evident also at Member State level and over a somewhat longer period.

Up to now, the debate about shifts in the employment structure in developed economies has largely been oriented around two main patterns of growth – upgrading and polarisation. Each has its own underpinning narrative – ‘skill-biased technological change’ in the case of upgrading and ‘routine-biased technological change’ in the case of polarisation.

### Upgrading and polarising employment shifts

With upgrading employment shifts, the pattern expected is a more-or-less linear improvement in employment structure, with the greatest employment growth in high-paid (or high-skilled) jobs and the weakest growth in low-paid (or low-skilled) jobs, with middling growth in the middle. With polarisation, the main difference is that the relative positions in terms of employment dynamics of the middle and bottom of the job distribution are swapped: employment growth is weakest in the middle and relatively stronger at both ends of the job distribution, leading to a ‘hollowed middle’.

The main explanation of the differences in the two accounts is the contention by exponents of routine-biased technological change that those jobs most vulnerable to technological displacement are routine jobs (clerical and manufacturing or production jobs), which happen to predominate in the middle of the wage distribution in developed economies. Less routine jobs – personal services at the bottom of the distribution and knowledge-intensive professional services at the top – are less vulnerable to replacement by machines.

In practice, employment changes observed at country level only approximate such schematic shapes; they are a mix of both or are some hybrid, less discernible shape. In the EU as a whole, over the periods covered by this report’s analysis from 1995, employment shifts have tended to be upgrading but with some evidence of polarisation, which becomes more obvious in recessions.

What both patterns show – and what the theoretical explanations that predict them agree on – is relatively strong top-quintile employment growth, and this has been, to date, one of the empirical regularities of jobs-based analysis in developed-world labour markets. There has been greater employment growth in well-paid jobs employing those with generally high levels of education or training than in mid-paid or less well-paid jobs.

It is suggestive that a recent, more long-run analysis of the US labour market by David Autor, one of the main proponents of routine-biased technological change/employment polarisation, has pointed to relatively stronger growth in the lower part of the wage distribution in the US during 1999–2007, accompanied by stagnant growth in the middle and top of the wage distribution (Autor, 2010, p. 3).

This analysis also finds echoes in the conclusions of previous work on the US and selected European labour markets. In the US, patterns of employment shift tended to change in a negative direction each decade from the 1960s through the 1990s (Wright and Dwyer, 2003). What was a clear upgrading picture in the US in the 1960s became progressively more polarised in succeeding decades.

In Eurofound's work covering employment from the mid-1990s, a somewhat similar trajectory has been observed in the EU aggregate data, albeit over different periods. The pre-crisis employment expansion was mainly upgrading but with some polarisation. The crisis itself has been clearly polarising but with some upgrading (the top quintile continued to grow). The most recent pattern (2013 Q2–2014 Q2) could be described as polarising or downgrading, with some justification for either description, but not as upgrading.

Of course, not too much should be read into results based on just one year's data. As previously noted, there may be some statistical 'noise' in the year-on-year changes that tends to disappear over longer time frames. In an earlier analysis of 1998–2007, for example, downgrading was not observed in any Member State (Eurofound, 2008). It is the task of the EJM to identify changing patterns of employment but, at the same time, most applications of the jobs-based analysis tend to use multiyear periods – up to a decade in much of the US research – in order to capture change in the employment structure that is more likely to be structural in nature. This is the value of the approach. Changing patterns identified using one year's data are best treated as interesting food for thought and the basis of hypotheses to be tested with further waves of data, rather than definitive evidence of anything in particular.

A second caveat as regards the 2013–2014 EU aggregate data is that the nature of the employment shifts tends to be heavily influenced by the UK data, given its very significant contribution to aggregate EU net employment growth in the period. The jobs-based approach by construction emphasises marginal employment change from one period to the next. In the UK, as will be apparent, employment growth for the most recent year is also skewed towards the bottom quintiles. A simple check – omitting the UK data from the EU aggregate employment shift for 2013 Q2–2014 Q2 – recasts the quintile chart in a more upgrading light by reducing the observed employment growth in the lower two quintiles. What is clear, however, is that the most recent data – not just in the UK but also in Germany, Italy and quite a few other, less populous Member States – points to relatively faster growth in low-paid jobs in 2013–2014 than has been the case previously. As already indicated, recent US research suggests that here, too, employment growth in the immediate pre-crisis period was downgrading. Neither of the main orthodox, technology-based explanations of shifts in labour demand is consistent with such downgrading employment shifts. But to the extent that the change of pattern persists, it will require a new, broader explanatory framework. Some of the main determinants that should figure in such a framework were outlined in last year's annual report (Eurofound, 2014) and include trade and labour market institutions in addition to use of technology and technological change.

In any case, for a number of reasons, it will be interesting to see if the recent relative downgrading persists in the employment structure. Firstly, developments in the US employment structure have tended to prefigure those in the EU if one looks at previous jobs-based analysis. If relative downgrading continues to happen in the EU, similar patterns to those that Autor (2010) has presented for the US in the immediate pre-crisis period may be observed. A possible explanation is that policies of labour market deregulation and liberalisation have tended to be implemented first in the US before being 'exported' to the EU. For example, the 1994 OECD jobs study, which influenced subsequent EU employment policy, offered a largely US solution to the diagnosed European problem of high

structural unemployment. Its recommendations included introducing greater flexibility in pay and in hiring and firing and reducing incentives to remain unemployed, and were predicated on lower unemployment rates in the US – where such policies were largely already in place – compared to continental European countries where, with some exceptions, they were not.

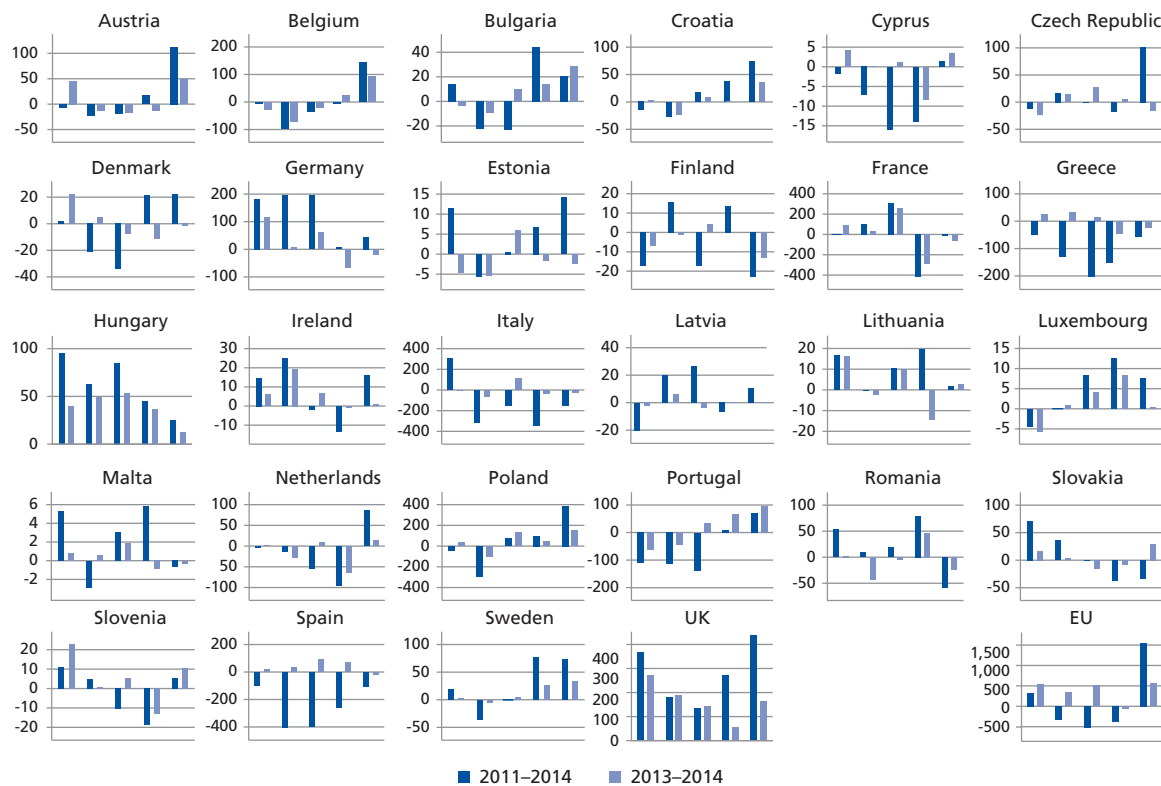
Secondly, at present, most forecasts are for modest but increasing output growth in the EU in 2015–2016. If the employment gains that result are to be concentrated in the lower rather than the upper quintiles of the wage structure, this could have serious implications for training and education policies. It is possible that European educational structures – currently well on the way to meeting their Europe 2020 strategic objectives in terms of the share of 30–34-year-olds having a degree – may be producing a surfeit of graduates for the available jobs requiring a third-level qualification. High levels of education may be intrinsically a public good, but frustration is likely at an individual level because of over-qualification and mismatches between jobs and skills if education levels outstrip demand for high-skilled jobs in the labour market.

Finally, downgrading employment shifts in developed economies also feed into the topical current preoccupation with secular stagnation and the possibility that the developed world is entering a new longer-term phase of reduced growth (about 1% per annum output growth compared to the recent long-run average of about 2%). The expression has various connotations relating to the changing global division of labour, monetary policy, demographic ageing and the declining economic returns to technology and innovation but, at base, it expresses an anxiety about the capacity of developed societies to generate sustainable increases in productivity associated with rising prosperity and living standards. There is, for example, an important debate in the UK about the country's current 'productivity puzzle' (Barnett et al, 2014), where economic recovery is more apparent in the employment data than in output data. As discussed earlier, the UK has contributed disproportionately to recent employment growth in the EU, but productivity growth continues to be very weak, precisely the opposite of what has occurred in post-recession, jobless recoveries going back to the 1990s. This, in turn, is linked to a debate over the 'living wage' in a context of declining average real-wage levels during 2008–2013. Unexpected developments like this are a warning that this might be a period of transition.

## Employment shifts in Member States

Figure 5 presents net employment change between 2011 Q2 and 2014 Q2 by wage quintile for all Member States.



**Figure 5: Employment change (in thousands) by job-wage quintile, EU, 2011 Q2–2014 Q2**

Note: Data for Germany for 2012 Q2–2014 Q2; see Annex 2 for treatment of data breaks in France, Germany, the Netherlands and Romania. Annex 3 includes data tables of the main aggregate employment shifts by Member State.

Source: EU-LFS

Over the three-year period 2011–2014, the countries with an obvious downgrading pattern of employment shift were Germany (2012–2014), Hungary, Italy and Slovakia. In each, employment growth was strongest in the lowest-paid jobs and weaker (or negative in the case of Italy and Slovakia) in higher-paid jobs. Over the most recent 12-month period for which there is data, 2013 Q2–2014 Q2, Denmark, Greece, Ireland, Slovenia and the UK have also demonstrated bottom-skewed employment growth. Recent employment dynamics have also been polarising in Austria. As already suggested, the UK figures strongly influence the overall EU aggregate pattern, given relatively dynamic employment growth in 2013–2014, but there are other countries where increasingly bottom-skewed employment creation is contributing to more of a downgrading pattern.

With reference to the three-year bars (2011–2014), the most obvious examples of countries where the employment structure is upgrading are Austria, Belgium, Croatia, Denmark, Luxembourg, the Netherlands, Poland, Portugal and Sweden. There is no obvious commonality in this group. In previous annual reports, attention was drawn to what appeared to be an association between the severity of impact of the recession on national labour markets and the resulting employment shifts. Polarising shifts were more likely in severely affected labour markets (Greece, Ireland and Spain), while upgrading shifts were more likely in Member States where the economy and labour market were more resilient to the effects of the crisis. It is less easy to sustain this association between employment performance and the nature of the employment shifts in view of the current country data. For example, neither of the two national labour markets that have contributed most to absolute employment growth in 2011–2014 (Germany, by 900,000 jobs, and the UK, by 1,400,000

jobs) exhibits upgrading. In the UK, the pattern has been clearly polarising, with a tendency more recently to bottom-skewed growth as net employment creation has accelerated. In Germany, growth over 2012 Q2–2014 Q2 has been mainly in the middle and bottom of the wage distribution.

Member States with clear polarising employment shifts in 2011–2014 include Cyprus, Estonia, Greece, Ireland, Spain and the UK. All are countries that endured severe recessions in the wake of either the global financial crisis or the euro zone crisis. One of the most obvious manifestations of this was a construction sector bust affecting middle-quintile employment. As employment has begun to recover in many of these Member States, it is interesting to note the diversity in the qualitative patterns behind the quantitative improvements. Employment growth in 2013–2014 has been mainly in low-paid jobs in Greece, Ireland and the UK, in mid-paid jobs in Estonia and Spain, and has been polarised in Cyprus.

In summary, there is large variation in the short-term patterns of employment shift across countries but with some clear cases of upgrading and polarisation, a smaller number of cases of clear downgrading, and a large number of hybrid or irregular patterns. At the aggregate EU level over 2011–2014, the pattern is one of upgrading, with some modest polarisation; more recent employment growth (2013–2014) has been skewed towards lower-quality jobs.

## Growing and declining jobs

The quintile charts show where in the job-wage distribution employment is being created and destroyed, but they do not identify the specific jobs responsible for the observed shifts. In practice, even though the number of jobs with employment identified using the jobs-based approach ranges from around 400 to 2,000 by country, depending on size, a small number of jobs account for a high share of employment in all countries. A quarter of EU employment is concentrated in just 11 jobs and a half in around 60 jobs. Because of their size, it is employment shifts in the jobs that employ large numbers that tend to influence the shape of the quintiles most.

**Table 1: Top 10 jobs by employment, greatest growth and greatest loss, EU, 2011 Q2–2014 Q2**

Top 10 jobs by employment						
Occupation	Sector	Quintiles			Employment (thousands)	% change p.a. 2011–2014
		Wage	Education	Job quality		
Sales workers	Retail trade	1	2	3	12,021	0.0
Teaching professionals	Education	5	5	5	9,591	0.5
Market-oriented skilled agricultural workers	Crop and animal production, etc.	2	1	2	6,752	-1.4
Health professionals	Human health activities	5	5	3	4,742	2.4
Personal service workers	Food and beverage service activities	1	2	1	4,096	2.2
Building and related trades workers	Specialised construction activities	2	2	2	4,035	-5.2
Drivers and mobile plant operators	Land transport and transport via pipelines	3	2	1	3,864	-1.0
Health associate professionals	Human health activities	4	4	3	3,732	-0.1
Business and administration associate professionals	Public administration and defence; compulsory social security	4	4	5	3,018	-1.3
Building and related trades workers	Construction of buildings	3	1	1	2,214	-3.4



## Top 10 jobs by relative employment growth

Occupation	Sector	Quintiles			Employment (thousands)	% change p.a. 2011–2014
		Wage	Education	Job quality		
Information and communications technology professionals	Computer programming, consultancy, etc.	5	5	5	1,426	10.0
Business and administration professionals	Activities of head offices; management consultancy activities	5	5	5	613	9.2
Legal, social, cultural and related associate professionals	Education	3	4	3	936	7.2
Legal, social, cultural and related associate professionals	Residential care activities	3	4	4	504	5.5
Personal care workers	Activities of households as employers of domestic personnel	1	2	2	516	5.4
Personal care workers	Residential care activities	2	3	3	1,935	5.4
Stationary plant and machine operators	Manufacture of food products	2	1	1	717	4.9
Health associate professionals	Residential care activities	2	4	3	591	4.7
Cleaners and helpers	Services to buildings and landscape activities	1	1	1	2,183	4.2
Legal, social and cultural professionals	Creative, arts and entertainment activities	4	5	3	623	3.8

## Top 10 jobs by relative employment decline

Occupation	Sector	Quintiles			Employment (thousands)	% change p.a. 2011–2014
		Wage	Education	Job quality		
Customer services clerks	Financial service activities	4	4	4	928	-5.3
Building and related trades workers, excluding electricians	Specialised construction activities	2	2	2	4,035	-5.2
Sales workers	Wholesale trade	2	3	4	962	-5.0
Cleaners and helpers	Human health activities	1	1	2	527	-4.7
Drivers and mobile plant operators	Wholesale trade	2	1	2	544	-3.5
Building and related trades workers, excluding electricians	Construction of buildings	3	1	1	2,214	-3.4
Business and administration associate professionals	Retail trade	3	4	4	626	-3.3
General and keyboard clerks	Public administration and defence; compulsory social security	3	4	4	1,327	-3.2
Labourers in mining, construction, manufacturing and transport	Wholesale trade	2	1	1	505	-2.8
Personal service workers	Education	2	3	4	510	-2.5

Note: EU28, 2014 Q2 data for top 10 jobs by employment. Figures for average annual percentage growth (2011 Q2–2014 Q2) in the last column are calculated based on data from 25 Member States (excluding France, Germany and the Netherlands due to classification breaks in these countries) and are based on large-employing jobs at EU28 level (500,000+ employees) only.  
Source: EU-LFS (authors' calculations)

The first part of Table 1 shows that the two largest-employing jobs in the EU – sales workers in retail (12 million) and teaching professionals in education (9.6 million) – had stable employment over the three-year period, with a very modest increase recorded in teaching professionals. Biggest absolute and relative job losses continued to occur in construction sector jobs. Employment in this sector continues to contract at aggregate EU level six years on from the construction busts that accompanied the global financial crisis of 2007–2008. Building workers and those in related trades in the distinct specialised construction activities and construction of buildings sectors suffered annual employment declines of between 3.4% and 5.2%. Relatively greatest growth occurred in large-employing service jobs at the top (health professionals) and the bottom (personal service workers in food and beverage service activities) of the wage distribution.

This pattern is also apparent when looking at large-employing jobs outside the top 10. The second and third parts of the table list fast-growing and fast-declining jobs after restricting the job sample to those 74 jobs (occupation by sector) employing at least 500,000 people in the EU. The fastest annual employment growth (10%) has been recorded in the job of information and communications technology (ICT) professional in computer programming and consultancy, but other lower-level service jobs, such as personal care worker in various sectors, have also experienced fast growth.

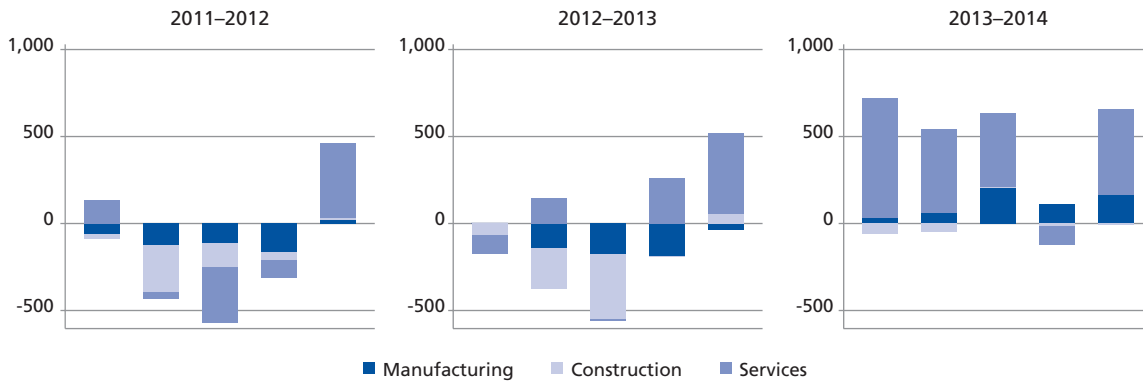
The greatest relative decline in employment was in customer service clerks in financial services, probably reflecting the twin impacts of post-crisis job-cutting and the migration online of basic bank-telling functions. Aside from the construction sector jobs already mentioned, there are three other noteworthy features in the list of fast-contracting jobs. Firstly, the list comprises mainly low-paid and mid-paid jobs. There are no well-paid, top-quintile jobs on it; this is the corollary of the general resilience of top-quintile employment growth. Secondly, there are three predominantly state-paid jobs on the list, including clerical grades in the public administration, reflecting pressures on the public sector pay bill post-2011. Finally, the appearance of four retail or wholesale sector jobs on the list suggests the strong impact of forces of technological displacement of labour in these sectors (resulting from the spread of self-service and online shopping). It may also relate to the post-crisis rationalisation of retail activity in the EU, evident, for example, in the rapid cross-border spread of large, discount retailers and the associated decline of smaller retail outlets, and the demise of large, traditional retailers such as Woolworths in the UK and Arcandor in Germany.

### **Where are jobs being created and destroyed?**

Employment destruction during the post-crisis period was highly concentrated in two sectors – construction and manufacturing – with net losses of over eight million jobs during 2008–2013. Employment declined consistently in both broad sectors over the period. During the last year (2013 Q2–2014 Q2), aggregate EU manufacturing employment experienced growth for the first time since 2007, growing by just over half a million jobs, while the construction sector continued to shed employment, albeit at a slower rate. There were around 200,000 fewer construction jobs in 2014 Q2 compared to 12 months previously. The preponderance of mid-paid and mid-low-paid employment in manufacturing and construction was the principal factor behind the sharp employment polarisation observed during the crisis, as job destruction in these sectors tended to ‘hollow out’ the employment structure. The growing share of service sector employment accounted for all net employment growth, and this has tended to be concentrated in the top two quintiles of the wage distribution.

With the resumption of aggregate employment growth, one can anticipate a change in the shape or pattern of employment shifts in 2013 Q2–2014 Q2. This can be observed in Figure 6.

**Figure 6: Year-on-year employment shifts (in thousands) by job-wage quintile and broad sector, EU, 2011 Q2–2014 Q2**



*Note:* The broad sectors of utilities and the primary sector are omitted.

*Source:* EU-LFS, SES (author's calculation)

There are a number of points worth noting in Figure 6. Employment continued to polarise in 2011–2013 (albeit asymmetrically with an upward skew), after the peak years of the crisis. This was a consequence of continuing employment destruction in the construction and manufacturing sectors at the same time as services employment grew in the top quintiles.

In 2013–2014, there was a significant change in employment shifts in all three broad sector groupings. Net employment losses were pared in the construction sector and were confined to jobs in the two lowest quintiles. Manufacturing contributed significantly to employment growth in all three top quintiles, with the gains more-or-less equally distributed across the three. Meanwhile, the service sector made by far the largest contribution to net employment growth in 2013 Q2–2014 Q2, but the nature of this growth was less upgrading than before. Services employment grew in all quintiles except the mid-high-paid quintile, with greatest net growth in the bottom quintile. This is the main factor behind the change in the overall pattern from one of asymmetrical polarisation to one of more-or-less evenly distributed growth in 2013–2014.

In manufacturing, recent employment growth appears to be broad-based and distributed across many jobs in skilled blue-collar and white-collar grades. The five manufacturing jobs with the greatest employment growth were science and engineering associate professionals in food manufacturing and chemicals manufacturing; assemblers in auto manufacturing and metal manufacturing; and machinery and related craft workers in fabricated metal products manufacturing. All five jobs are either in the mid-paid or mid-high-paid quintile.

Services employment growth has spread down the wage distribution. Employment growth in 2013 Q2–2014 Q2 was as likely to take place in lower-paid jobs as in higher-paid jobs, marking a sharp change from previous years. There were, for example, over 200,000 new personal service workers in the food and beverage sector. This was the job contributing most to services employment growth. An important qualification is that much of this net employment growth in lower-level services took place in the UK, which, as already noted, has a disproportionate influence on the aggregate picture.

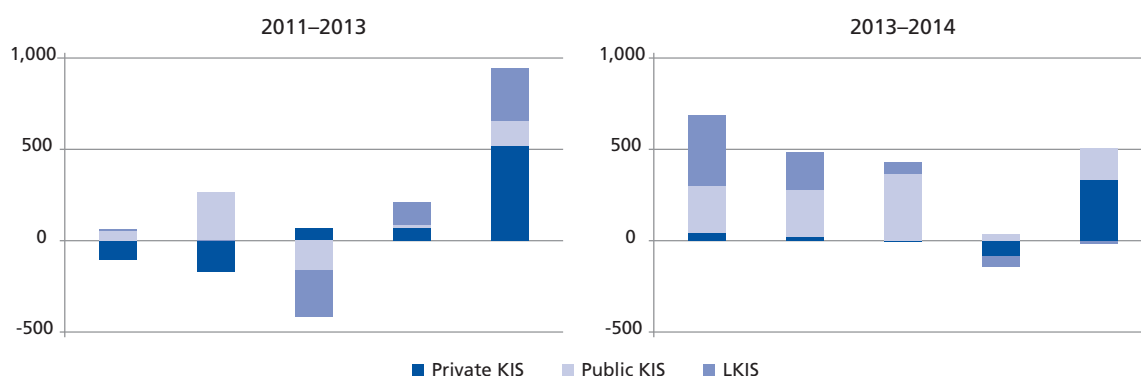
because it contributed nearly half of net EU employment growth across all quintiles over the 12-month period.

### Service sector jobs contributing most to employment growth

Services account for 7 out of 10 jobs in Europe, and this sector's share of overall employment is growing as that of the manufacturing and the primary sectors declines. There were 2.8 million net new service sector jobs in 2014 Q2 compared with 2011 Q2. Figure 7 differentiates between growth in three areas of the sector: public knowledge-intensive services (public KIS); private knowledge-intensive services (private KIS); and less knowledge-intensive services (LKIS).<sup>6</sup> The left panel shows changes over the earlier two-year period (2011 Q2–2013 Q2), while the right shows just the most recent changes (2013 Q2–2014 Q2).

Aggregate growth has been more-or-less equally shared between public and private KIS, with LKIS sectors also contributing some growth, mainly in the bottom two quintiles but also in the top quintile (as a result of growth in professional jobs in the wholesale and retail sector).

**Figure 7: Employment shifts (in thousands) by job-wage quintile and service sector grouping, EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

Private KIS – comprising a broad range of activities including media, ICT, consulting, advertising, financial, legal services and accounting – accounted for the majority of top-quintile employment growth, adding just over 800,000 well-paid jobs during 2011 Q2–2014 Q2. Specific jobs in this category include ICT professionals in computer programming, as well as business and administrative professionals in head office and management consultancy activities, the two fastest-growing big jobs as previously indicated (see Table 1 above).

Public KIS – comprising health, education and public administration – added employment in the lowest quintile. This was as a result of strong growth in employment of cleaners and helpers in health, residential care and social work activities. Public KIS also contributed to growth in the top two quintiles, mainly as a result of growing numbers of health professionals in the health sector.

<sup>6</sup> This breakdown relies on the Eurostat aggregation of services sectors into 'knowledge-intensive services' (KIS) and 'less knowledge-intensive services' (LKIS). As there is no specific question in the EU-LFS regarding the public or private status of the respondent's employer, it is not possible to estimate accurately the respective shares of public and private sector services employment. To make the distinction in this report, the KIS category has been further broken down into public and private service components. Public KIS comprises the following NACE sector categories: public administration, social security and defence, education, and human health activities. Private KIS comprises all remaining 'knowledge-intensive services' (see Annex 4 for a full list). It should be noted that as a significant minority of workers in the health and education sectors are in fact private sector employees, the public KIS category is an imprecise proxy of public sector employment.

There were two noteworthy recent developments in 2013 Q2–2014 Q2. The first is the resumption of public KIS employment growth in 2013–2014. The previous two years, 2011–2013, marked the beginning of major post-crisis public sector retrenchment in many Member States, and there was no growth in these sectors at aggregate EU level in this period (employment growth in growing quintiles matched decline in declining quintiles). An important qualification here is that there is likely to be a growing share of private sector employment in the traditionally predominantly state-funded sectors of health and education, as well as increased levels of outsourcing in these sectors and in the core public administration (Eurofound, 2015). In other words, some of the employment growth attributed to public KIS in Figure 7 is likely in reality to be in the private sector.

The second development is that most of the recent growth in services employment has been bottom-skewed, with the greatest growth in low-paid, bottom-quintile jobs. Previously, services employment has tended to be very much top-skewed. This fresh surge of low-paid employment has been in jobs such as the cleaner and helper jobs identified above (in the public KIS sectors) and in retail sales workers and personal service workers in the food and beverage sector (in LKIS).

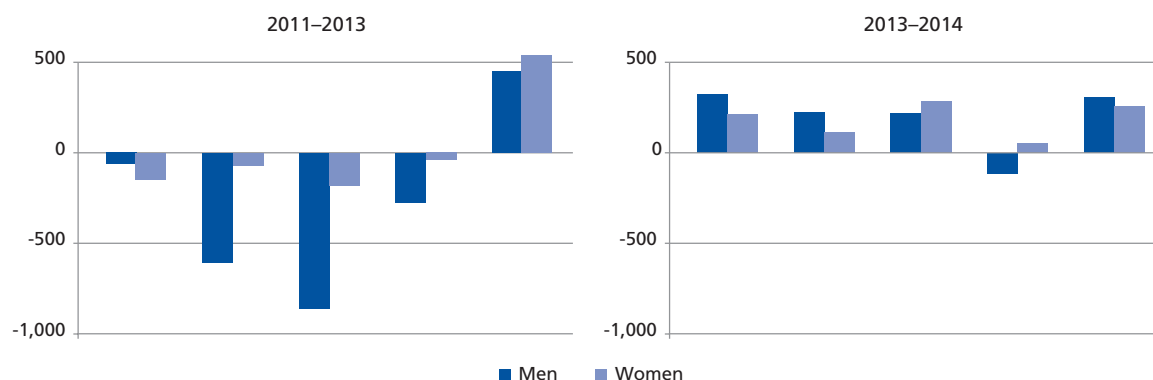
### **Patterns of employment change by worker characteristics**

In the sections that follow, recent employment change (2011 Q2–2014 Q2) is broken down by job-wage quintile, according to the background variables of gender, educational attainment and age, and by various employment status dichotomies: full time and part time; self-employment and employee; and fixed-term and permanent contract. Following on from the discussion in the previous chapter, the analysis also tries to identify any recent shifts in the pattern of employment change by comparing year-on-year growth.

#### **Male employment growth catching up**

Since 2008, the EU gender employment gap has contracted by some 2 percentage points, reflecting the greater impact of the crisis in sectors that employ men predominantly, especially in its early 2008–2010 phase. Male employment, especially in manufacturing and construction, contracted very sharply, while sectors such as health and education, which predominantly employ women, continued to add new jobs. Women now account for 46% of total employment in the EU. They outnumber men in the Latvian and Lithuanian workforces and are close to parity (at more than 48%) in Cyprus, Estonia, Finland, France and Portugal.

**Figure 8: Employment shifts (in thousands) by job-wage quintile and gender, EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

In the period 2011 Q2–2013 Q2, women continued to fare better than men numerically, mainly as a result of the continuing sectoral composition effects already mentioned; construction and manufacturing were still the main sectors shedding employment. As Figure 8 shows, during this period of net employment destruction, women accounted for the majority of new well-paid jobs and were much less affected by the sharp employment declines in mid-low-paid and mid-paid jobs. Employments shifts were more polarising for men and more upgrading for women.

Employment growth in 2013 Q2–2014 Q2 was more evenly balanced by gender. The biggest difference from the previous two-year period is the recovery of male employment in low-paid and mid-paid jobs. To a certain extent, this growth is a replacement of previously shed employment. The biggest rise in male employment in an individual job, for example, was that of metal, machinery and related trades workers in fabricated metal products. This job had previously shed over 100,000 jobs between 2011 Q2 and 2013 Q2 and had contracted even faster in the period going back to 2008. This is a classically male, industrial job: 96% of workers in this job in the EU are men. With the resumption of manufacturing employment growth, it has recovered some of its previous losses.

Male employment has also been growing in lower-paid services, often in jobs that have been predominantly female until now. Two of the fastest-growing jobs for male employment have been personal service workers in the food and beverages sector and cleaners and helpers in building services.

### Net employment growth not confined to third-level graduates

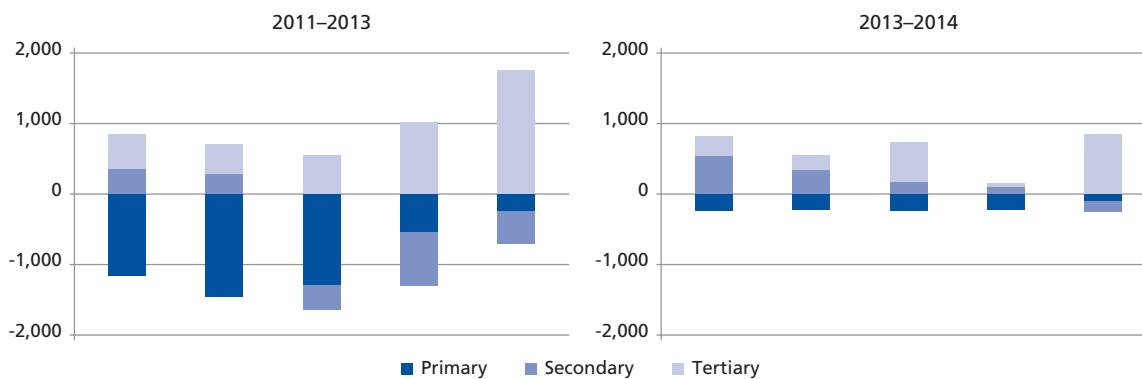
One of the headline Europe 2020 policy targets for the end of the decade is for 40% of those aged 30–34 to be third-level graduates. This should be comfortably met as in 2013 the rate was 36.9% and had increased by around a percentage point each year since 2010. This educational upgrading and the expansion of the tertiary education system that sustains it is the supply side response to the increasing skill demands of European economies. The canonical theory of shifts in labour demand is that of skill-biased technological change, which holds that technological advances increase the demand for higher-skilled workers, while decreasing the demand for lower-skilled workers – often through replacement of routine jobs by automation.

As presented in previous jobs-based research (Eurofound 2008a, 2011, 2013, 2014), this theory finds broad support from recent European employment data. Since 1995, the most consistent development at aggregate EU level has been relatively faster growth in well-paid, high-skilled jobs.

Figure 9 captures – and exaggerates, given strong cohort effects – some of the dynamics of this ‘race between technology and education’ (Goldin and Katz, 2009). In this narrative, collective advances in the supply of human capital through the education system try to keep up with the increasing skill demands in developed economies brought about by technological advances. With both processes advancing together in synchronisation, as they largely did until the 1980s and 1990s in the US, increased productivity and rising living standards should result.

Supporting evidence from the EU data is that net employment growth has benefited third-level graduates, especially in the top quintile. Here, a third-level credential is increasingly a requirement of entry to the labour market. However, even in the lowest quintiles, graduates account for most employment growth, which raises the problem of possible over-qualification while also implying a possible glut of graduate-level labour in many Member States. As Marin (2014) points out, referring to World Input-Output Database data, the rate of expansion of adults with a third-level degree has been much higher in many EU Member States compared to the US (excepting Germany) since the mid-1990s, suggesting that ‘education policy in Europe was far too aggressive, given the demand for skills’.

**Figure 9: Employment shifts (in thousands) by job-wage quintile and educational level, EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

Job destruction in the ‘second recession’ of 2011–2013 exclusively affected those with lower-level qualifications. As aggregate employment growth returned in 2013–2014 and some labour markets began to tighten, the chances to secure employment increased for those people who had completed secondary education. This growth was not limited to the lowest quintile – though it was highest here – but included jobs in the mid-paid and mid-high-paid quintiles.

Figure 9 conveys the extent of the transformation of the workforce in terms of educational attainment – even over a relatively short period of three years. Older generations with lower levels of education retire or depart the labour market to be replaced by better-educated younger and core-age workers. In 2014 Q2, there were over six million more graduates in employment in the EU compared to three years previously. The pace of this recomposition appears to be most rapid during periods of net employment destruction, which disproportionately affect low-skilled and medium-skilled workers while, in relative terms, favouring graduates.

In summary, labour markets – especially the UK labour market but also, for example, labour markets in Ireland, Hungary and Germany – appear again to be offering greater employment opportunities to those with completed secondary as well as tertiary education, and this is one of the main reasons



behind the most recent employment recovery in low-paid and mid-paid jobs. The broader pattern, however, underlines that a third-level degree is increasingly a prerequisite, but not a guarantee, of employment in mid-paid and higher-paid jobs.

### Rapid workforce ageing

Employment levels have increased for all five-year age categories above 45 years and have declined for all those below 45. However, this is in part due to demographic shifts. Table 2 controls for broader population ageing by showing the employment rate changes for each five-year age group between 2011 Q2 and 2014 Q2. As can be seen, even with this adjustment, there is a dramatic increase in employment rates of older workers, notably those in the pre-retirement cohorts, 55–59 years and 60–64 years, but also in the 65–69 age group (although this latter cohort is relatively marginal in terms of headcount). Over the same period, employment rates have declined for younger age cohorts (aged less than 35 years).

**Table 2: Employment rate (2014 Q2) and change (2011 Q2–2014 Q2), by age and job-wage quintiles**

Employment rate (%) in 2014 Q2 decomposed by wage quintile												
	15–19 yrs	20–24 yrs	25–29 yrs	30–34 yrs	35–39 yrs	40–44 yrs	45–49 yrs	50–54 yrs	55–59 yrs	60–64 yrs	65–69 yrs	70–74 yrs
Quintile 1	6.9	15.4	14.9	13.8	14.1	14.6	14.9	14.1	12.0	7.1	2.5	1.3
Quintile 2	3.4	11.4	13.6	13.9	14.3	15.0	15.2	15.0	13.3	7.9	3.0	1.8
Quintile 3	2.2	9.9	14.0	14.7	15.6	15.8	16.1	15.8	13.6	6.7	1.6	0.7
Quintile 4	1.3	7.9	15.2	16.6	16.7	16.6	16.0	15.0	12.6	6.5	1.9	0.8
Quintile 5	0.2	3.9	13.6	18.3	19.0	18.3	17.3	16.2	14.1	8.4	2.5	1.0
Total	14.1	48.5	71.4	77.3	79.6	80.3	79.5	76.2	65.6	36.6	11.5	5.5

Percentage point change in employment rate 2011 Q2–2014 Q2												
	15–19 yrs	20–24 yrs	25–29 yrs	30–34 yrs	35–39 yrs	40–44 yrs	45–49 yrs	50–54 yrs	55–59 yrs	60–64 yrs	65–69 yrs	70–74 yrs
Quintile 1	-0.6	0.2	0.4	0.2	0.2	-0.2	0.1	0.4	0.5	1.1	0.1	0.0
Quintile 2	-0.2	-0.5	-0.5	-0.6	-0.5	-0.4	-0.2	-0.3	0.8	0.9	0.1	-0.1
Quintile 3	0.1	-0.3	-0.4	-0.5	0.0	-0.2	-0.6	0.0	0.8	0.9	0.1	0.1
Quintile 4	0.1	-0.4	-0.1	-0.2	0.2	0.1	-0.4	-0.1	0.5	0.8	0.3	0.1
Quintile 5	0.0	0.0	-0.4	0.7	0.8	1.2	0.6	0.3	0.5	1.1	0.2	0.2
Total	-0.5	-0.8	-1.1	-0.4	0.7	0.5	-0.6	0.2	3.1	4.8	0.9	0.3

Source: Eurostat, EU-LFS, SES (author's calculations)

Breaking this down by job-wage quintile, the decline in the employment rate for the younger age cohort is concentrated in mid-paid jobs; there is an increase in employment rates in low-paid jobs for those aged 20–39. For the core-age cohorts (35–54 years), despite modest employment rate increases, the profile of employment shifts was more clearly upgrading, with the top-quintile employment rate growing relatively fastest amongst those aged 30–49 years. Among older age groups (55 and over), employment (rate) growth was more-or-less evenly distributed across the job-wage distribution.

### Patterns of employment change by employment status

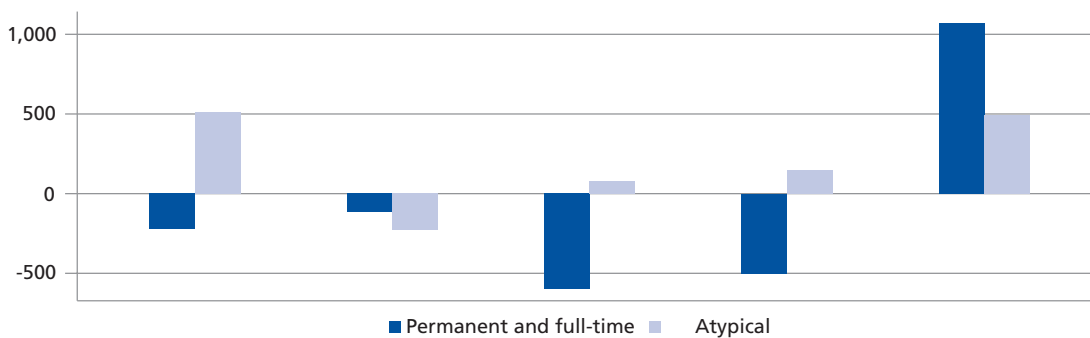
A decreasing share of European workers are in full-time, permanent employment, but this traditional core employment status still describes some 58% of them. There is a wide variation across Member States, with only one in three Dutch workers having core employment status compared with over 80% of workers in Estonia, Bulgaria and Latvia. There is also great diversity across the EU in the composition of non-standard employment and, as illustrated in the sections that follow, in the employment trends for each type of non-standard work across countries.



### Decline in full-time, permanent employees

Figure 10 differentiates between recent employment growth for ‘core’ workers – employees with full-time, permanent status – and ‘atypical’ workers – those who work part time or on temporary contracts or who are self-employed. Atypical employment has increased in four of the five quintiles, with significant growth recorded in the top and the bottom quintiles (of around 500,000 jobs in each). Core employment, on the other hand, has increased only in the top quintile – where it accounts for around 70% of growth – but has been destroyed in all other quintiles and has declined overall in absolute terms.

**Figure 10: Employment shifts (in thousands) by job-wage quintile and employment status, EU, 2011 Q2–2014 Q2**

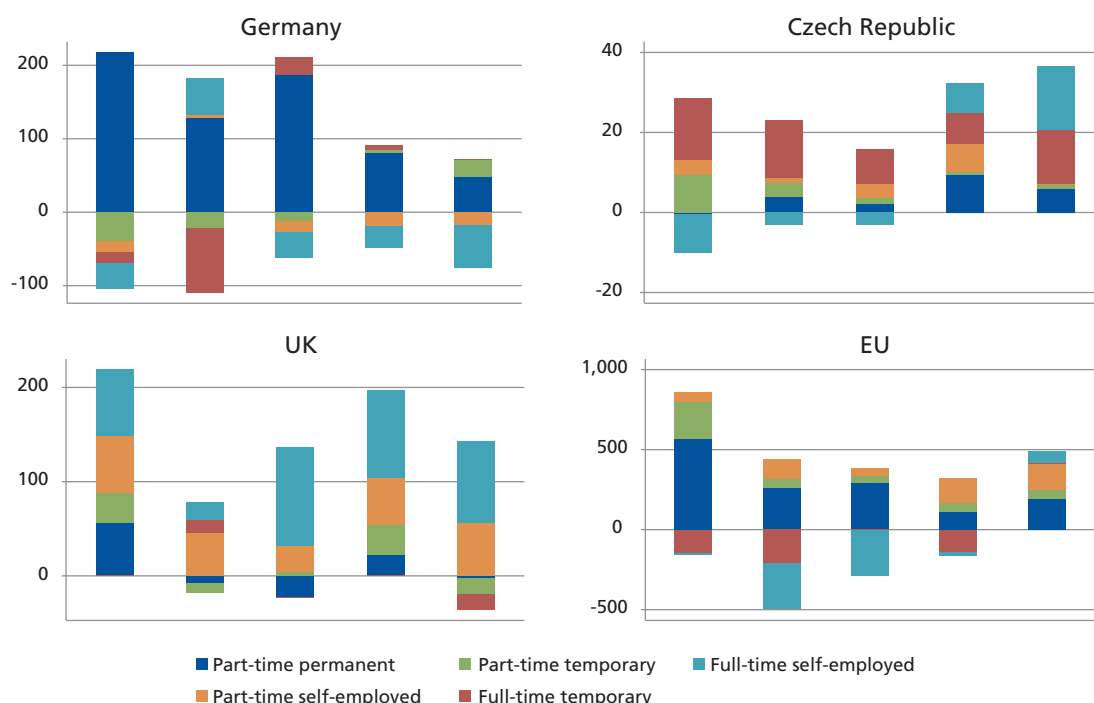


Source: EU-LFS, SES (author's calculations)

So the process of destandardisation has affected different segments of the wage distribution differently. There is evidence that full-time, permanent employees have been replaced by non-standard or atypical workers, especially in low-paid but also in mid-paid jobs, and the traditional ‘standard’ employment relationship is increasingly the privilege of those in well-paid jobs. The countries in which the non-standard share of employment has been growing fastest include the four most populous Member States – France, Germany, Italy and the UK – as well as Austria, Cyprus, the Czech Republic and the Netherlands. As Figure 11 confirms, there is no single template for this destandardisation.

The figure breaks down non-standard work into its main component categories, including combined categories such as part-time self-employed and part-time temporary. In the UK, the main component of growth in non-standard work has been in self-employment – both full time and part time – and has been skewed towards the top quintiles. In the Czech Republic, full-time, temporary work accounts for significant growth across the quintiles, with self-employment also accounting for much top-quintile growth. In Germany, the growth of lower-paid part-time work has been the most obvious feature, although the explanation for this appears not to lie in the growth of ‘mini-jobs’ and ‘euro jobs’ introduced by the Hartz reforms a decade ago. Recent German data indicates that employment of those working exclusively in mini-jobs and those in euro jobs has been in decline since 2011 (IZA, undated). Part-time work in Germany appears, therefore, to be growing independently of (this) labour market policy and almost exclusively among women. The country now accounts for a quarter of part-time workers in the EU.

**Figure 11: Employment shifts (in thousands) by job-wage quintile in non-standard forms of work, Germany, Czech Republic, the UK and the EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

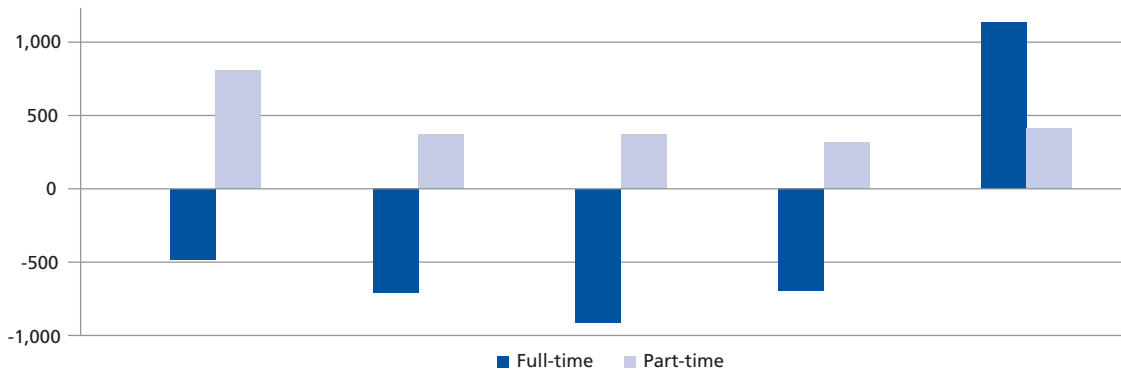
As the next section will discuss, the main factor behind the recent destandardisation of the employment relationship in the EU as a whole, as well as Germany in particular, has been the rise of part-time work. In 2014, it accounted for just less than 21% of all employment (up from 16% in 2002).

### Rapid increase in part-time work

Part-time employment grew across the quintiles between 2011 Q2 and 2014 Q2 and accounted for 2.3 million net new jobs. Meanwhile, full-time employment continued to decline in absolute numbers from 2009 through to late 2013. It was only in the 12 months from Q2 2013 to Q2 2014 that full-time employment began to record positive growth. Over the three-year period, it contracted by around 1.7 million jobs. Part-time growth has been strongest in the lowest quintile (Figure 12). The three part-time jobs that grew most were those of sales workers in retail and cleaners and helpers in social work activities and services to buildings. But it also grew more-or-less evenly across jobs in the higher quintiles, which suggests some normalisation of part-time employment even in higher-paid jobs, as has been the case for teaching professionals and health professionals, for example.

Consistent with Figure 10, showing the split between standard and atypical employment, full-time employment grew only in the top quintile – where it accounted for the majority of growth – and declined in all four lower quintiles.

**Figure 12: Employment shifts (in thousands) by job-wage quintile and full-time and part-time status, EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

The share of part-timers has increased especially sharply in Austria and Germany in recent years and also continued to grow in the Netherlands, where in 2014 the number of part-time workers actually overtook that of full-time workers for the first time. In countries where labour market performance has been weaker and the workforce overall has contracted since 2011 – such as Cyprus, Greece and Spain – there has, nonetheless, been positive growth in part-time employment. This has taken place more or less across the quintiles of the wage distribution in these countries but, in each case, has only partially compensated the much more substantial decline in full-time employment in the same jobs.

An emerging pattern since the recession has been the increasing share of male part-timers. Four out of five part-time workers in the EU are women, but the net increase in part-time employment in recent years has been much more evenly distributed by gender. Over a million new part-time male workers were added to the EU workforce between 2011 and 2014. There is also further evidence of a normalisation of part-time work with trend increases across the wage distribution.

#### Self-employment growing at both ends of the wage distribution

The self-employed account for around 15% of overall employment, and this figure has tended to be stable in recent years. As Figure 13 indicates, self-employment contributes only modestly to overall employment shifts at aggregate EU level. This growth has been mainly in the top two quintiles and has taken place largely in professional occupations in education, health, legal and accounting services, and ICT. In the bottom quintile, the ongoing decline in agricultural employment has been compensated for by growth in personal services employment so that the two contrasting developments roughly even out.

**Figure 13: Employment shifts (in thousands) by job-wage quintile and professional status, UK and EU, 2011 Q2–2014 Q2**



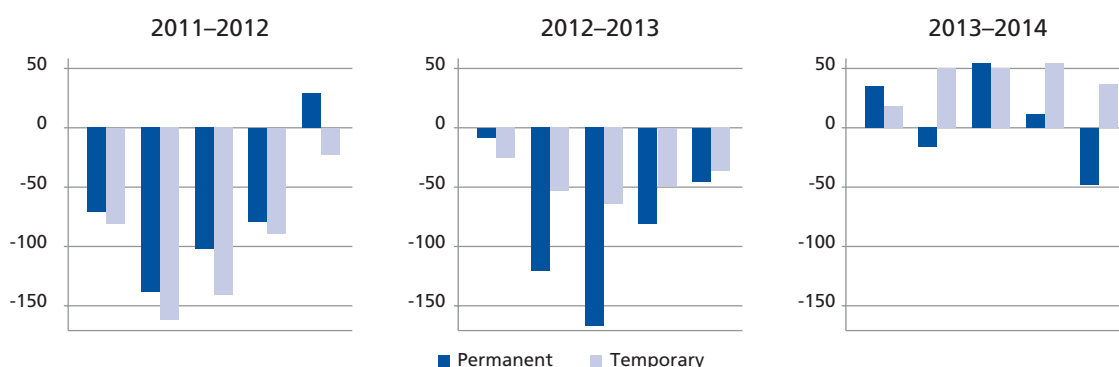
Source: EU-LFS, SES (author's calculations)

The UK is one of the Member States – along with Ireland, Lithuania and the Netherlands – where a disproportionately high share of new employment since 2011 has been among the self-employed. This growth has been relatively evenly spread across the wage distribution, with similar jobs benefiting at the top, as in the overall EU aggregate data – teaching professionals in education and business professionals in management consultancies – and at the bottom – cleaners and helpers and personal services workers. There has also been some growth in the middle quintiles as self-employment in the construction sector has begun to recover.

### Stability in temporary employment

Fixed-term employment is especially sensitive to the business cycle. It tends to decrease more sharply than aggregate employment during periods of recession, as temporary employees are likely to be shed first. The corollary is that temporary employment rises faster as economies recover because employers are more likely to take on fresh recruits on a temporary basis initially, pending more secure prospects. Recent developments in Spain, which until recently had the highest share of temporary workers in the EU, are a vivid illustration of how sensitive temporary employment levels are to the business cycle.

**Figure 14: Employment shifts (in thousands) by job-wage quintile and temporary and permanent employment status, Spain, 2011 Q2–2014 Q2**

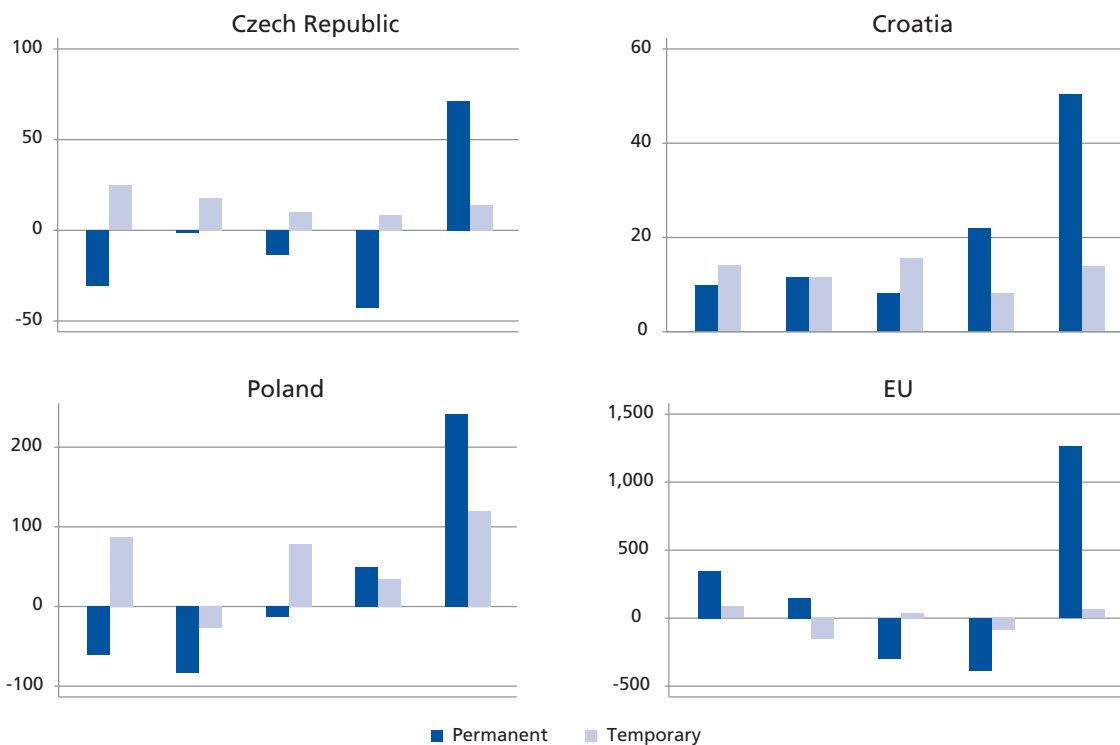


Source: EU-LFS, SES (author's calculations)

In the unprecedented destruction of employment that has taken place in Spain since 2008, the sharpest declines were experienced in the immediate aftermath of the global financial crisis. However, as Figure 14 shows, employment continued to contract right up to mid-2013. Temporary employees bore the brunt of these losses. In 2011–2012, they accounted for the majority of job losses, even though fewer than one in three Spanish workers had a temporary contract at this time. Temporary employment losses abated somewhat in 2012–2013 and were the mainstay of employment recovery in 2013–2014, with increases across the quintiles.

In the EU as a whole, during 2011 Q2–2014 Q2, temporary employment declined, albeit very marginally and with much variation across Member States (Figure 15). In Germany and Spain, there were significant declines in temporary employment for contrasting reasons. A tightening labour market in Germany is likely to have prompted employers to switch temporary positions to permanent status or to recruit more workers directly on a permanent basis, while in Spain the tail-end of a destructive recession has disproportionately affected its comparatively large share of temporary workers through the simple expedient of non-renewal.

**Figure 15: Employment shifts (in thousands) by job-wage quintile and temporary and permanent status, Czech Republic, Croatia, Poland and the EU, 2011 Q2–2014 Q2**



Source: EU-LFS, SES (author's calculations)

Increasing fixed-term employment was observed in the Netherlands as well as in many central and eastern European Member States, including Croatia, the Czech Republic, Hungary and Poland – now the Member State with the highest share of temporary workers at 28.4% (2014 Q2). At aggregate EU level, almost all employment growth in top-quintile, well-paid jobs was among those with a permanent contract.

## Summary

- Employment in the EU increased by around 1.8 million in 2013 Q2–2014 Q2. This is the largest year-on-year increase since the beginning of the global financial crisis in 2008. Nearly half of the increase in employment was accounted for by one Member State, the UK. There has also been positive employment growth in the Member States most affected by the global financial and euro zone crises. Employment grew in all of the four countries in EU–IMF–ECB assistance programmes, and employment levels grew by more in Spain than Germany over the 12-month period.
- The pattern of employment shifts has altered since the resumption of employment growth, with more net new employment in low-paid and mid-paid employment. Employment levels of those with non-tertiary qualifications have begun to rise again since 2013 Q2. The pattern of employment growth in the EU over the most recent three-year period (2011 Q2–2014 Q2) as well as the peak recession period before it (2008 Q2–2010 Q2) has been one of asymmetrical polarisation, with greater growth in the top quintile. The most recent pattern (2013 Q2–2014 Q2) is less easy to label but is more downward-skewed, mainly as a result of stronger growth in less knowledge-intensive services (such as personal services, retail, and hotels and restaurants).
- During 2011 Q2–2014 Q2, most countries exhibited one of three patterns of employment shift – polarising, upgrading or downgrading. Polarisation was observed in three of the four ‘programme’ countries – Cyprus, Greece and Ireland – as well as Estonia, Slovenia, Spain and the UK. The clearest examples of upgrading employment shifts were in Austria, the Czech Republic, Poland, Portugal and Sweden. The clearest examples of downgrading shifts were in Hungary, Italy and Slovakia, although Germany (2012–2014) also exhibited greater employment growth in the lower quintiles.
- Atypical employment, notably part-time work, has grown, while the levels of those in full-time work, and more specifically of the core workforce of full-time employees with a permanent contract, continues to decline – in relative and absolute terms. Growth in full-time, permanent employment is increasingly confined to top-quintile, well-paid jobs; in all other quintiles of the wage distribution it is decreasing.
- Educational upgrading has resulted in a sharp rise in workers with a third-level qualification and in a contraction in the share of those without such a credential. From 2008 to 2013, net employment growth occurred almost exclusively for those with degrees. Resumption of more customary levels of employment growth in 2013 Q2–2014 Q2 has, however, manifested itself in rising levels of employment for those with completed secondary education in each of the bottom four wage quintiles.
- The fastest-growing, large-employing jobs are well-paid, top-quintile service sector jobs, such as ICT professionals in computer programming, and business professionals in management consultancies. While services continue to account for most recent employment growth (more than 7 out of every 10 workers in the EU now work in services), there has been growth in manufacturing employment since 2013 Q2, both in mid-paid technician occupations and in well-paid managerial and administrative roles. The construction sector in Europe continues to shed employment, mainly in the lower quintiles of the wage distribution.
- The crisis destroyed male employment disproportionately, largely due to the sectors that were hardest hit. Most recent employment growth (in 2013 Q2–2014 Q2) has been more evenly

balanced by gender. The biggest difference from the previous two-year period is the recovery of male employment in low-paid and mid-paid jobs. Women continue to take up more of net new employment in well-paid jobs.

- The workforce is ageing faster than the general population. There is a strong age profile to shifts in all forms of employment, with all five-year age groups over 45 growing and all groups under 45 contracting. The fastest-growing group is that of 65–69-year-olds, with self-employment particularly contributing to this increase. On the positive side, it is likely that transitions to self-employment are enabling many older workers to continue in active employment up to and beyond traditional retirement age. On a less positive note, levels of entrepreneurial self-employment, more common among younger and core-age workers, are in decline.

# Long-term trends in the employment structure in six European countries

## Introduction

In the early 1970s, the structure of European economies and labour markets was very different from today. The post-war model of European capitalism was at its peak after three decades of very rapid economic growth and full employment. Manufacturing was still the dominant economic sector, even if it was no longer the sector with the largest proportion of employees (if it ever was). In most families, there was still a single male breadwinner, generally with full-time, permanent employment. Unemployment was extremely low in comparison to the following decades. Most of these features of 1970s European economies are gone after four decades of rapid structural change. In most countries, the pace of economic growth has slowed significantly. Full employment has been effectively abandoned as a goal of economic policy, being replaced by the control of inflation and macroeconomic stability; and, partly as a result, unemployment has increased significantly and remained relatively high, even in periods of economic growth. The service sector has replaced manufacturing as the dominant sector of the economy. The single-male-breadwinner model has declined and almost disappeared, while part-time and fixed-term employment have become much more prevalent than before.

How did the employment structure change as a result of these large-scale economic transformations? What kinds of jobs were created and destroyed as European economies deindustrialised? Did the abandonment of full employment lead to a decrease in the number of low-skilled jobs available? What kinds of jobs did women take up as they streamed into the labour market in this period? These are the kinds of questions that this chapter will address, reviewing and discussing more than four decades of change in the employment structures of six European countries: Germany, Ireland, Spain, Sweden, Switzerland and the UK.

The analysis will use an approach very similar to that used in the previous chapter for examining recent developments in Europe, although some adaptations are needed in order to use older and less detailed data sources. The relative simplicity of the jobs-based approach (using the standardised classifications of occupation and sector to evaluate the net effect of job creation and destruction on the employment structure) allows for large-scale comparisons of structural change over time and space. The basic requirement is the existence of more-or-less standardised labour force surveys, which are available in most countries worldwide and have been available in many European countries since the 1970s. It is difficult to expand the analysis further back, although for some countries it might be possible to do this using different sources, such as census data (see Murphy and Oesch, 2014).

There are some precedents for using a similar approach for the study of long-term trends in the employment structure, although they focus on individual countries. The most important are the studies of Wright and Dwyer (2003) covering the US; Goos and Manning (2007), covering the UK; and Spitz-Oener (2006) covering Germany. Wright and Dwyer found a significant diversity of patterns between 1960 and the 2000s in the US, although with an underlying consistent trend: starting from an unambiguously upgrading pattern in the 1960s, each decade showed the structural change in employment shifting more towards a polarising pattern, which was clearest in the 1990s. For the UK, Goos and Manning looked at the period 1979–1999 as a whole, finding a pattern of polarisation in the long run (without discussing possible differences in the patterns of sub-periods, as done by Wright and Dwyer). Spitz-Oener carried out a long-term analysis of Germany between



1979 and 1999, with similar results as those of Goos and Manning (again without looking at possible changes in the patterns of structural change over time).

The five EU Member States covered in this chapter account for more than 40% of the EU population and represent the different European employment and welfare models (except for the Member States that have acceded since 2004, for which there is no long-term data). As far as is known, this is the widest coverage so far for a study of long-term trends of structural change in employment. The analysis has been carried out separately in each country using national data sources and national expertise, but applying the same methodology to four of the six countries (Germany, Spain, Sweden and the UK) and making some minor changes (to be discussed later) in the case of two (Ireland and Switzerland). Following the 2003 study by Wright and Dwyer, the analysis of change in employment structures over the four decades will be broken down into sub-periods linked to the business cycle whenever possible (although sometimes data limitations force a different breakdown). This enables the existence of variations in the patterns of structural change in different periods of recent economic history to be evaluated.

The next section describes the project on which this chapter is built and the methodology followed. This is followed by an outline of some contextual economic and demographic data on the period and countries covered, presenting a series of initial questions with respect to structural change that the subsequent sections will try to answer. The chapter then discusses the broad patterns of structural change in employment in the six countries covered and proceeds to break down these overall patterns by economic sector, evaluating the occupational implications of structural economic change. The gender dimension of these developments is examined, and the final section presents some conclusions and briefly discusses some policy implications.

## **Methodology**

This chapter is a synthesis of analyses carried out by five national teams of researchers working in parallel in 2014, under the coordination of Eurofound and the University of Salamanca. The analyses of Ireland and Switzerland were carried out by collaborators outside these core teams; the results for these countries will be included in the discussion of overall patterns of structural change, but not in the subsequent discussion of the occupational implications of structural change.

Each national team worked with different (national) data sources, applying a common methodological approach but adapting it to their national specificities as necessary. This approach is essentially the same one used in the other two chapters of this report, and it can be briefly summarised in the following steps:

1. For each country and period studied, each national team had to identify a source of data for employment levels (and other key demographic and economic variables, if possible) at the beginning and end of the period, and a source of data on wages for employees (which could be the same as the one used for employment or not). The full list of sources used can be found in Annex 6. A key requirement was that all these data sources used the same (or compatible) classifications of occupation and sector, so that they could be linked and analysed at the level of occupation-by-sector combinations (the ‘jobs’ of the jobs-based approach).
2. For each period, the wage data was used to generate a ranking of jobs. Linking this wage ranking with the data on employment in the initial year of the period, the jobs were assigned to job-wage

quintiles, comprising five groups of jobs, each with 20% of total employment in the initial year of the period, and with the jobs ranked from low to high wages.

3. The absolute and relative change in the size of each of those quintiles was then analysed for the period studied, and broken down by other variables such as gender.

When covering such a long period of time, it is important to break it down into a series of sub-periods. One methodological reason for this is the existence of breaks in the classifications. This method of analysis relies, to a large extent, on the consistency of occupational and sectoral classifications over time, and in the last four decades, such classifications have been subjected to several significant revisions that make them inconsistent. This can lead to misleading results, because the analysis is done by looking at the change in the number of people in specific occupational codes, and it is impossible to differentiate when the observed change results from reclassifications or from real structural change.

A related problem is the stability of relative wages over time: analysing four decades as a single period assumes that the wage ranking used in the beginning remains adequate for characterising jobs over the following four decades. Although there is some evidence on the stability of the wage rankings over shorter periods of around one decade (see the appendices to Wright and Dwyer, 2003), one cannot assume that they still fully apply four decades later. Relative wage positions do change over the long term.

Furthermore, to the extent that the patterns of structural change may change, it seems logical to break down the analysis into a series of distinct sub-periods. If there is a single dominant pattern of structural change, it will emerge from the analysis anyway; but the existence of diversity should not be precluded by merging all the patterns into a single picture.

However, the decision to break down the analysis into a number of sub-periods still leaves many questions. Do all countries use the same sub-periods? And what should define them? In a project like this, it is important to find a balance between consistency across countries (necessary for comparability) and flexibility for national adaptations (necessary for dealing with data constraints and national specificities). So rather than a common periodisation, common principles were agreed. First, the periods should, if possible, follow the economic cycle, differentiating episodes of economic growth and recession. The reason for this is that there is evidence that the business cycle matters for the patterns of structural change (Jaimovich and Siu, 2012; Eurofound, 2013). A secondary and inescapable reason for the periodisation is the existence of breaks in the classifications, which, as previously mentioned, can have very significant effects on results but unfortunately do not coincide across countries. A third reason, as already noted, was to avoid periods that were too long, so that differences in the patterns of structural change over time could be detected and to ensure that the wage rankings still applied to the economic structure.

**Table 3: Periods of analysis for the six countries studied**

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014		
Spain																																															
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Table 3 shows the periodisation used for the analysis in the six countries covered in this study. Each line corresponds to a period of analysis (with the arrows marking the beginning and end years). In many cases, though not all (particularly, not in the shortest), each period uses a separate wage ranking to assign the jobs to quintiles. In all cases (even in the shortest periods), the quintiles were recalculated at the beginning of each period, so that in the first year shown, the quintiles are real quintiles, each holding 20% of employment ranked by wages at the job level. The charts in this chapter will show (absolute or relative) change in the number of workers in each of the quintiles for each period (the number of workers in the final year minus the number of workers in the initial year).

As Table 3 illustrates, the periodisation is very different in each country. In Spain, Germany and Sweden, the periods are reasonably (although not perfectly) aligned with the economic cycle (see Figure 16). In the UK, Ireland and Switzerland, it was not possible to make such an alignment because of data constraints, which means that in some cases the up and down episodes of the business cycle may be conflated in a single period. This is unfortunate but unavoidable. Still, the overall picture should be relatively robust, and, in any case, the mismatch between periods and the business cycle is not complete.

Table 3 also shows some breaks that are more-or-less generalised: most importantly, the one in the early to mid-1990s (which corresponds with a change in the NACE classification) and the one around 2008–2010 (another break in NACE). The countries with the earliest coverage are Sweden and Switzerland (starting in 1970), while Germany has the latest start (1984). It should be noted that there are some gaps in the coverage, indicated by non-adjacent lines (for instance, Spain between 1993 and 1994). In most cases, such gaps result from changes in classification that make occupation or sector non-comparable between two years, so that one year of change has to be ignored in the analysis. However, such gaps are unlikely to have serious implications, since a single year of change is in most cases insignificant in the long run.

A final thing to note is that the periodisation of Ireland and Switzerland is slightly different from the rest: starting in 1970–1971, both countries have a very regular periodisation in 10-year periods (with the single exception of Ireland between 1991 and 1996). The data on the employment structure in these two cases comes from the census rather than labour force surveys, as in the other countries. This has the advantage of providing much larger samples and long-term broad comparability but the disadvantage of being less flexible in terms of periodisation (since a census is carried out only once every 10 years). Otherwise, the results are broadly comparable with those of the other countries.

## Contextual data and guiding questions

As has already been mentioned in the introduction, the last four decades have been a period of very significant structural change in the six countries covered in this study. Although there are important differences across countries, in general the 1970s marked a shift away from the Keynesian policies of full employment towards an emphasis on restraining inflation, keeping macroeconomic stability and reinforcing market mechanisms. The economy transformed from one dominated by manufacturing to one dominated by services. The period 1996–2013 was marked by increasing economic integration both within global markets and within European economic structures, culminating in the introduction of the euro at the turn of the century. Compared with the previous three decades, it was also a period of relatively slow productivity growth and persistently high levels of unemployment. With the exception of the late 1990s and early 2000s, perhaps, the policy debate about the European economy during the period has been dominated by gloomy concepts such as Eurosclerosis or, more recently, ‘secular stagnation’. A very significant (and much more positive) social development, with important implications for the purposes of this study, is the steady incorporation of women into the labour markets of Europe, to reach almost equal rates of participation by the end of the period.<sup>7</sup>

These broad trends have affected the small sample of six countries in this report quite differently. This is partly because they were in quite different stages of economic development at the beginning of the period, but also because their pace of change was quite different, although they broadly share some of the same underlying trends. And some differences persist in the structures of these economies. These differences are useful because they should show up in the later analysis of change in the jobs structure; so in order to guide this analysis, some basic contextual data for these countries will be presented first.

## Economic growth, employment and productivity

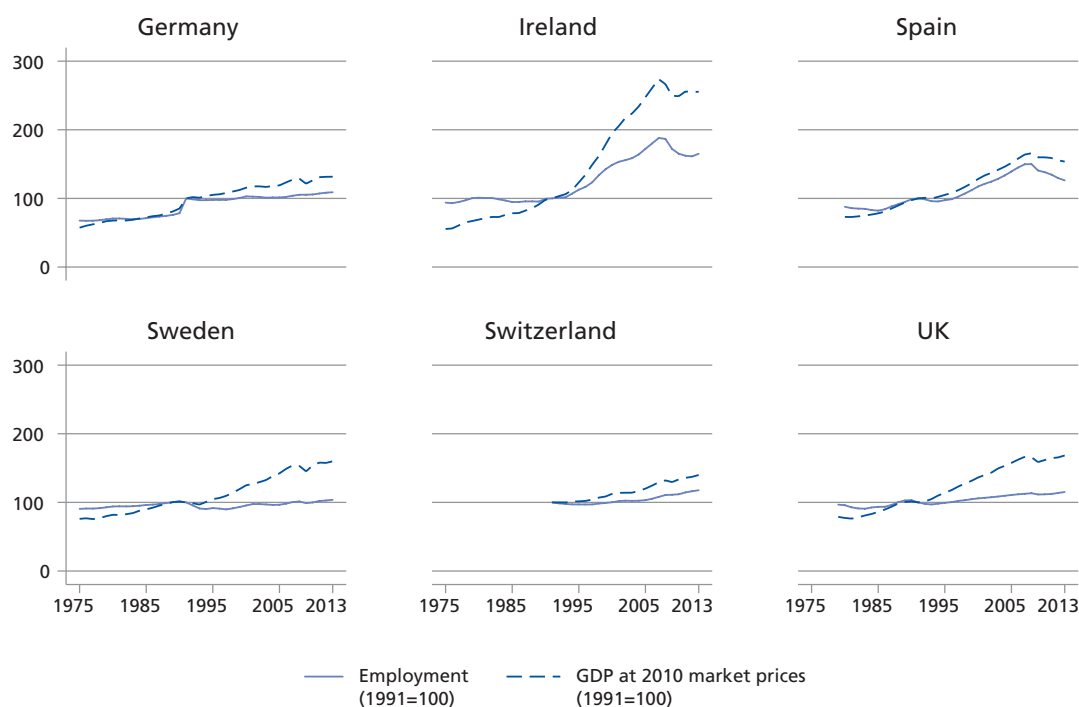
The first thing to consider is the overall development in economic growth, employment and productivity, represented in Figures 16 and 17.<sup>8</sup> These figures show very different developments across countries, especially in the second half of the period. Until the mid-1990s, most countries look similar, with largely stagnant employment levels and a slowly but steadily increasing GDP. But after the early to mid-1990s, there is a significant divergence: Germany and Switzerland remain on a similar trend, with near stagnation in employment and a small increase of GDP; Sweden and the UK show substantial growth in real GDP, although with no significant increase in employment levels (reflected in the massive growth in the simple measure of productivity as GDP per hour worked shown in Figure 17); and, finally, Ireland and Spain increase very significantly in both GDP and employment.

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<sup>7</sup> Another factor that often appears in the literature as an important driver of structural change in employment is the generalisation of the use of computers and the associated productivity revolution, which would have an effect on the employment structure to the extent that different jobs can be affected differently. (The most well-known argument is that jobs with more routine task content tend to be negatively affected; see Autor, 2010.) This would be important only in the second half of the period studied here, after the mid-1990s in particular. Before that period, even in the US there is very little evidence of any effect of computerisation on productivity (see Brynjolfsson, 1993; also Stiroh, 2002). Since this argument has already been discussed in detail for 1995–2007 (see Eurofound, 2014), it will not be discussed here.

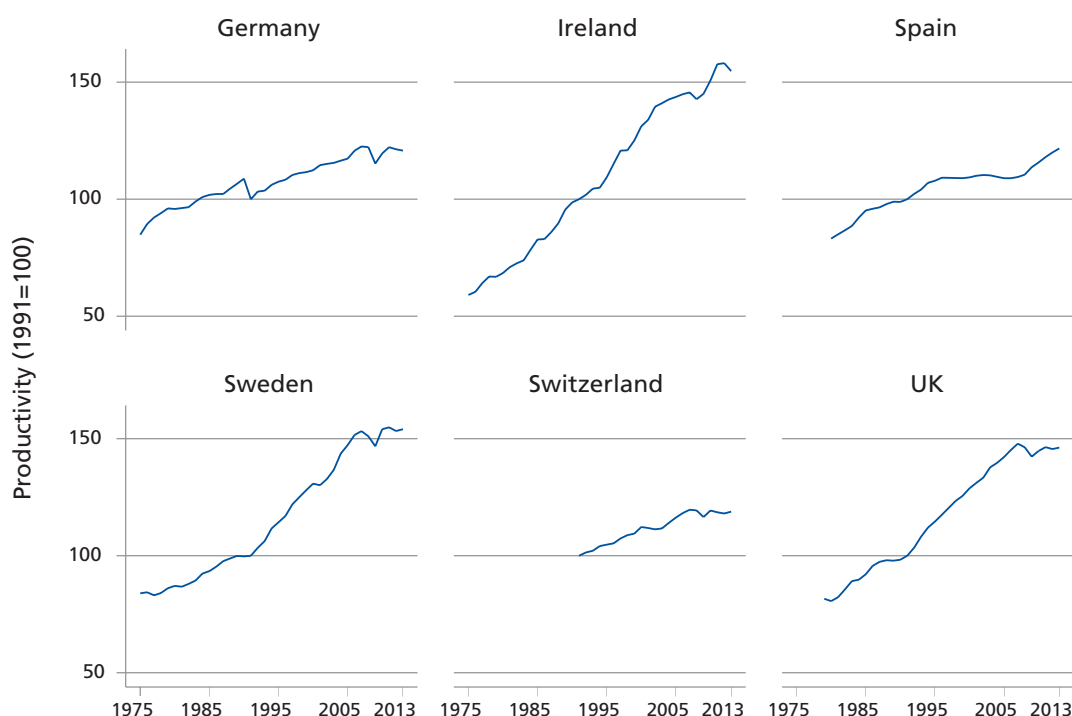
<sup>8</sup> Although it would be useful to have longer time periods for this contextual data, to compare the period under analysis with the rather different previous one, in most cases it was impossible to look back further because of a lack of data from before the 1970s (or the 1960s in a few cases).

**Figure 16: Employment and real GDP in six European countries, 1975–2013**



Source: AMECO database

Figure 17 shows that Ireland and Spain in the 1990s are very different when productivity per worker is looked at, despite looking similar in terms of robust employment and GDP growth. Whereas Ireland managed to expand productivity rapidly despite its massive employment growth, productivity in Spain in the period of economic expansion between 1995 and 2007 was almost flat (so that growth was purely the result of adding more workers to the economy, with no gain in efficiency).

**Figure 17: Aggregate productivity in six European countries, 1975–2013**

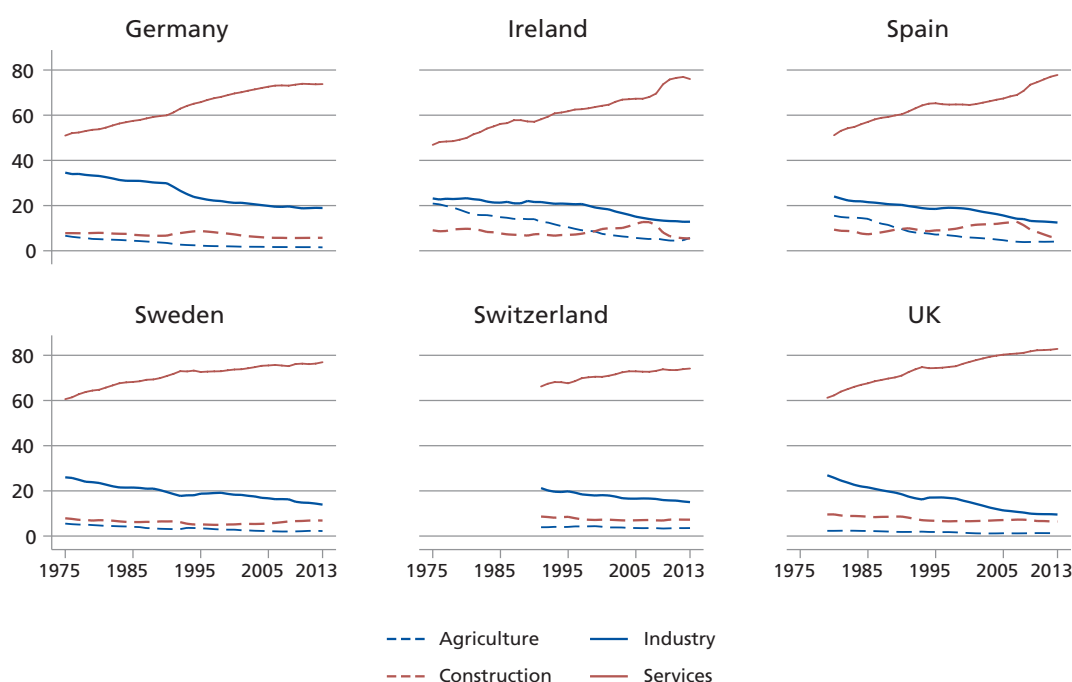
Note: Productivity is measured as real GDP per employee.

Source: AMECO database

This diversity in broad economic developments may be quite useful for the later analysis. Are the different types of growth (quasi-stagnant, productivity-driven or employment-driven) associated with different patterns of change in the employment structure? It seems a plausible hypothesis that higher productivity growth would be linked more to structural upgrading, while stagnation could be linked with polarisation, and employment-intensive growth with downgrading. A final guiding question is related to the cyclical ups and downs in GDP and employment growth, which are most obvious in Ireland and Spain but which affect all countries. Are the periods of economic expansion and recession associated with different patterns of structural change?

### Change in the sector composition of the economy

In terms of broad structural change, the trends were extremely similar in the six sample countries, as shown by Figure 18. In all countries, the service sector already dominated employment in 1975, accounting for around 50%, while manufacturing employed between 20% and 40% of the workforce, and agriculture less than 10%, except in Ireland and Spain (which had still sizeable agricultural sectors). In all countries, there was a very significant decline in the share of employment in manufacturing, which at the end of the period employed between 10% and 20% of workers, while the service sector had expanded to an overwhelmingly dominant position, approaching 80% of total employment.

**Figure 18: Share of employment (%) in six European countries, by broad sectors, 1975–2013**

Source: AMECO database

Although these overall trends are very similar, there are important differences in the details, which may be associated with significant differences in the patterns of structural change in employment. To see such differences more clearly, the charts have been rearranged in Figure 19 so that each one represents a sector and the lines represent countries (with two separate charts for each sector to facilitate the analysis). From this, it is clear that:

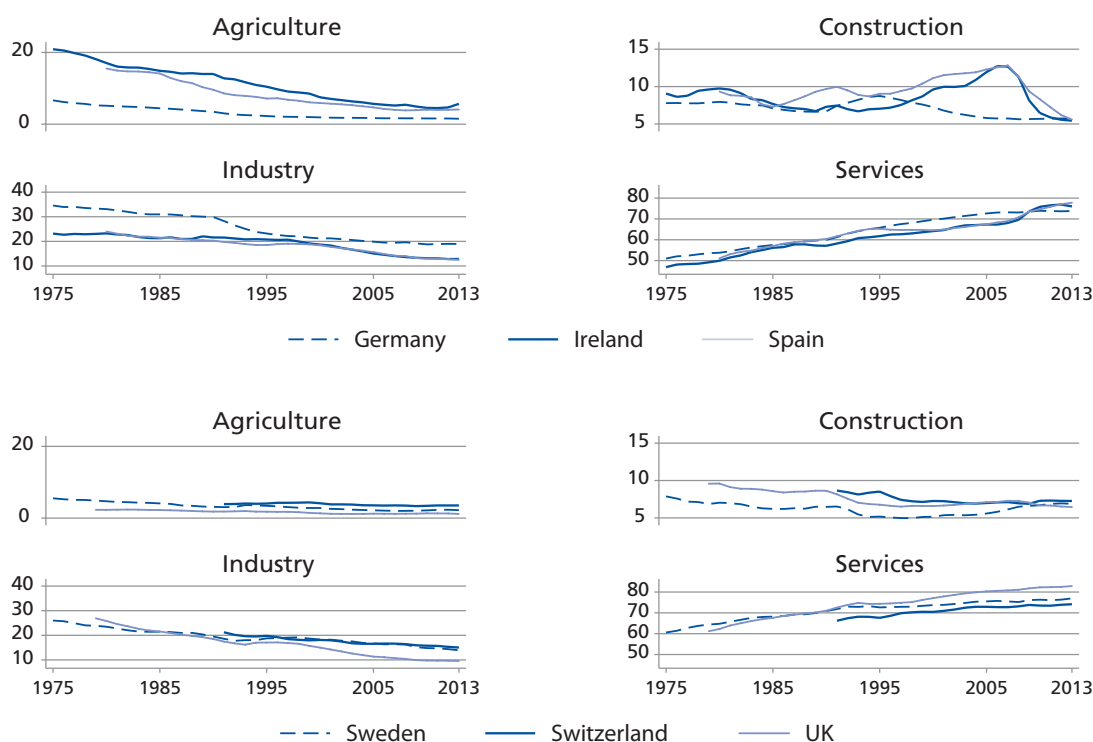
- as previously mentioned, Ireland and Spain started with a significantly larger agricultural sector, which declined to a level comparable with the other four countries over the period;
- the same two countries had a massively oversized construction sector in 2008, which collapsed very quickly to a more normal level (construction sector employment fluctuates the most in all countries, but the fluctuations in Ireland and Spain dwarfed all the others);
- Germany started with a very large manufacturing sector, which declined but remained comparatively big;
- the UK, which started with a relatively large manufacturing sector, experienced the fastest deindustrialisation process, ending with a service sector that accounted for more than 80% of employment.

The different economic sectors tend to be associated with particular positions in the employment structure, so these trends can result in different patterns of structural change. For instance, one might expect the late shift away from agriculture in Ireland and Spain to be associated with upgrading (since traditional agricultural employment tends to be low-paid). Since industrial occupations have often occupied middle positions in the employment structure, deindustrialisation could be linked to the hollowing out of the middle (so the deeper the deindustrialisation, the more polarisation is to be



expected). As for the overwhelming predominance of the service sector, it is so large that it is difficult to associate it with any particular position, so that its structural effect on employment seems more indeterminate.

**Figure 19: Share of employment (%) in broad sectors, by country, 1975–2013**

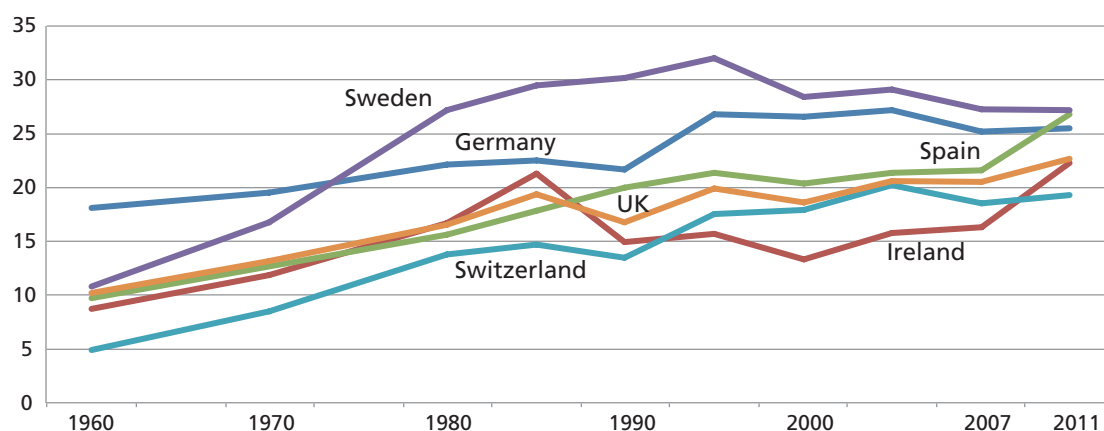


Source: AMECO database

### Importance of public sector employment

At the turn of the century, public sector employment accounted for a sizeable proportion of total employment in the six countries discussed here: according to ILO estimates, the proportion ranged from 18% of employment in Spain to 38% in Sweden. Unfortunately, the authors do not have international long-term figures on the evolution of public sector employment, but national-level data compiled for this project show a significant increase over the period studied, at least in the first half. An indirect approximation is provided by Figure 20, which shows social spending as a share of GDP between 1960 and 2011. As can be seen, the biggest increase takes place in most countries from 1970 and peaks for most around 1990; the exceptions are Ireland and the UK, where it peaked in the 1980s. Social spending decreased or remained stable after the 1990s, except in Ireland and Spain, where it increased with the economic crisis, because of increasing unemployment and declining GDP. Public sector employment decreased even in those countries after the crisis, however (Vaughan-Whitehead, 2013). As was the case with other data presented, there are some country differences despite the common overall trends. The biggest increase in social spending took place in Sweden, which went from a mid-low to a very high level in this period, while Germany started high but hardly changed, except during reunification in the early 1990s. The decline began earlier in Ireland and the UK, although in the UK there was some expansion in the late 1990s; and Switzerland continued expanding social spending until the 2000s.



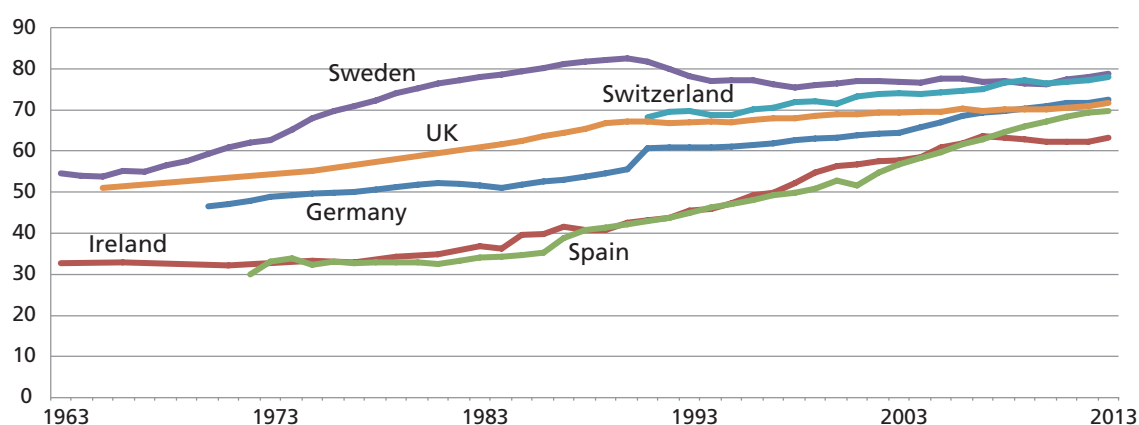
**Figure 20: Social spending (%) as a share of GDP in six European countries, 1960–2011**

Sources: OECD, 1988 (1960–1970); OECD Social Expenditure Database (1980 onwards)

To the extent that these trends are a reasonable approximation of the trends in public employment in the period, they suggest a significant expansion in the first half of the period and stagnation afterwards. How would these trends be reflected in the employment structure? What kinds of jobs were created by the state as an employer, not only in public administration but also in broader social services? Did those jobs contribute to structural upgrading, or did they expand the middle layers of employment? What happened when public sector employment stagnated?

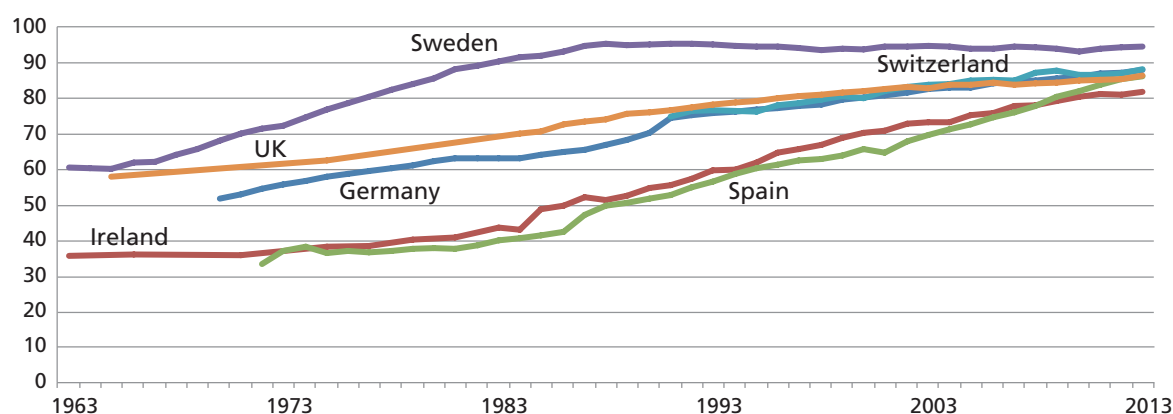
### Female labour force participation

The final key development for which some contextual figures are relevant is the near equalisation of labour force participation of men and women. This is one of the most significant social and economic transformations of the period being studied here, which alters not only the gender composition of the labour force but also the structure of demand for services by families. For instance, the massive incorporation of women into employment implies a boost in the demand for provision of household services that were traditionally performed by women outside the market (Dwyer, 2013). Figure 21 gives an indication of the scale of the change: from a labour force participation rate of less than 50% in the early 1970s (with the exception of Sweden and the UK, which had rates slightly above this level), there is a steady generalised increase to around 70%; this starts later in Spain and Ireland, but they catch up quickly, especially Spain. The differences between countries are mostly in terms of the initial position (with Sweden and the UK having an initial advantage, and the rate of increase, with the latecomers experiencing faster growth). But the process ends in a significant convergence that shows few outliers. Perhaps the clearest divergence is the change of trend in Ireland with the economic crisis, in contrast to Spain.

**Figure 21: Female labour force participation rate (%), 1963–2013**

Source: OECD

Figure 22 provides a clearer illustration of the significance of this development, showing female labour force participation rate as a proportion of the male participation rate (in other words, the extent of gender inequality in this respect). Female participation started at around 60% of male participation in Sweden and UK in the late 1960s, below 40% in Ireland and Spain, and somewhere in-between in Germany. In Sweden, it rapidly increased to nearly 100% in the mid-1980s, where it has remained since. In Germany, Switzerland and the UK, it increased more slowly but steadily until it approached 90%, according to the most recent figures. And in Ireland and Spain, it hardly moved at all until the early 1980s, when it increased rapidly, so that they have caught up with other European countries in the most recent figures, approaching 90% in the case of Spain, while stagnating somewhat at 80% in Ireland.<sup>9</sup>

**Figure 22: Female labour force participation rate (%) as a share of the male rate**

Source: OECD

Is this massive expansion of female employment linked to particular patterns of structural change? This may suggest that transformations of the employment structure have been driven by labour

<sup>9</sup> An important qualification to this development is the fact that a significant proportion of women work part time in all of these countries, which, to some extent, facilitates their work–life balance, but which can also both reflect and contribute to a still-disadvantaged employment situation.

supply, with the new abundance of female workers feeding the expansion of some typically female occupations. And demand for these occupations in many cases would simultaneously increase because of the increased participation of women in employment and their need to buy in the market services that they were previously providing domestically (Oesch, 2013; Dwyer 2013). But, in any case, in the presence of such large-scale transformations of the composition of employment, it is very useful to document and compare what kinds of positions the new entrants have taken in the employment structure.

### Patterns of upgrading and polarisation over four decades

Having set out the broad structural trends in the six economies under discussion, one can use the jobs-based approach to try to evaluate how these trends translated into the employment structure. A recap on this approach may be useful to begin with, to describe the type of representation of change in the employment structure that is used in this section and the next.

Figure 23 shows the quintile picture of change in the jobs structure for the period 1977–1985 in Spain. Each bar represents absolute change (in thousands) in the total number of people employed in one quintile, ranked by job-wage, between 1977 and 1985. The lowest-paid jobs, accounting for 20% of employment in 1977, declined very significantly (by 600,000 workers), the three middle quintiles also decreased noticeably but not so much (by around 400,000 workers), while the top quintile (comprising the 20% of employment with highest average wages at the job level) increased slightly (by 41,000 workers).

Overall, this was a period of intense job destruction (with a total decline in employment of more than 1.5 million jobs), but the pattern of structural change is one of significant upgrading, because the destruction was strongly biased downwards (in fact, there was some net job creation at the very top). Going back to the contextual information and guiding questions of the previous section, this ‘negative upgrading’ in the jobs structure was associated with a period of intense productivity growth and structural change in Spain (with negative employment growth but expanding GDP figures, as a result of intense restructuring). Public sector employment expanded significantly, which, as will be seen, explains the small expansion at the top, and there was, as yet, no major increase in female employment (which started growing after this period).

**Figure 23: Absolute change (in thousands) in job-wage quintiles, Spain, 1977–1985**

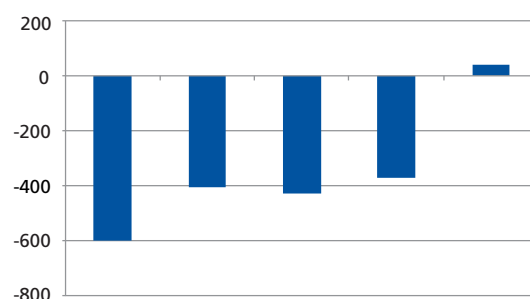


Figure 23 is just an illustration of change in the jobs structure for a single country in a short period. In Figure 24, the same kind of representation can be seen for the six countries and four decades covered in this study. This figure includes many quintile charts for different short periods of structural change, located within a bigger scheme that represents the different countries (on the horizontal axis) and time (on the vertical axis). Each individual quintile chart is located where it corresponds approximately in

the timeline: when the chart corresponds to a longer time period, arrows have been drawn on either side to represent the beginning and end years it covers. The representation of quintiles shown in Figure 23 has been embedded with the representation of countries and time coverage shown much earlier in Table 3. This way, developments across countries can be compared for the same period of time (along the vertical axis) and for the same countries over time (along the horizontal axis).

In Figure 24, the vertical axis of each quintile chart represents absolute change over each indicated period (in thousands), with the size of the axis being rescaled in each quintile chart. This is useful for identifying differences in the patterns of structural change across time, but can be misleading because the periods are rather heterogeneous (in shorter time periods, the extent of absolute accumulated change is likely to be smaller). Figure 25 shows an alternative representation in which change is rescaled to an annual average (simply dividing absolute change over each period by the number of years in the period), and all charts for the same countries are forced to have exactly the same vertical axis. This representation is more adequate for evaluating the intensity of change across different periods, independently of their duration.<sup>10</sup>

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<sup>10</sup> In Annex 7, there are two further alternative presentations of these results: one in which overall change in each period is represented in relative rather than absolute terms and one in which relative change is represented as an annual average (with a similar logic as Figure 25). These charts are useful for comparing the scale of change across countries, but have not been included in the main body of the report for reasons of space.

Figure 24: Absolute change (in thousands) in job-wage quintiles in six countries, 1970–2014

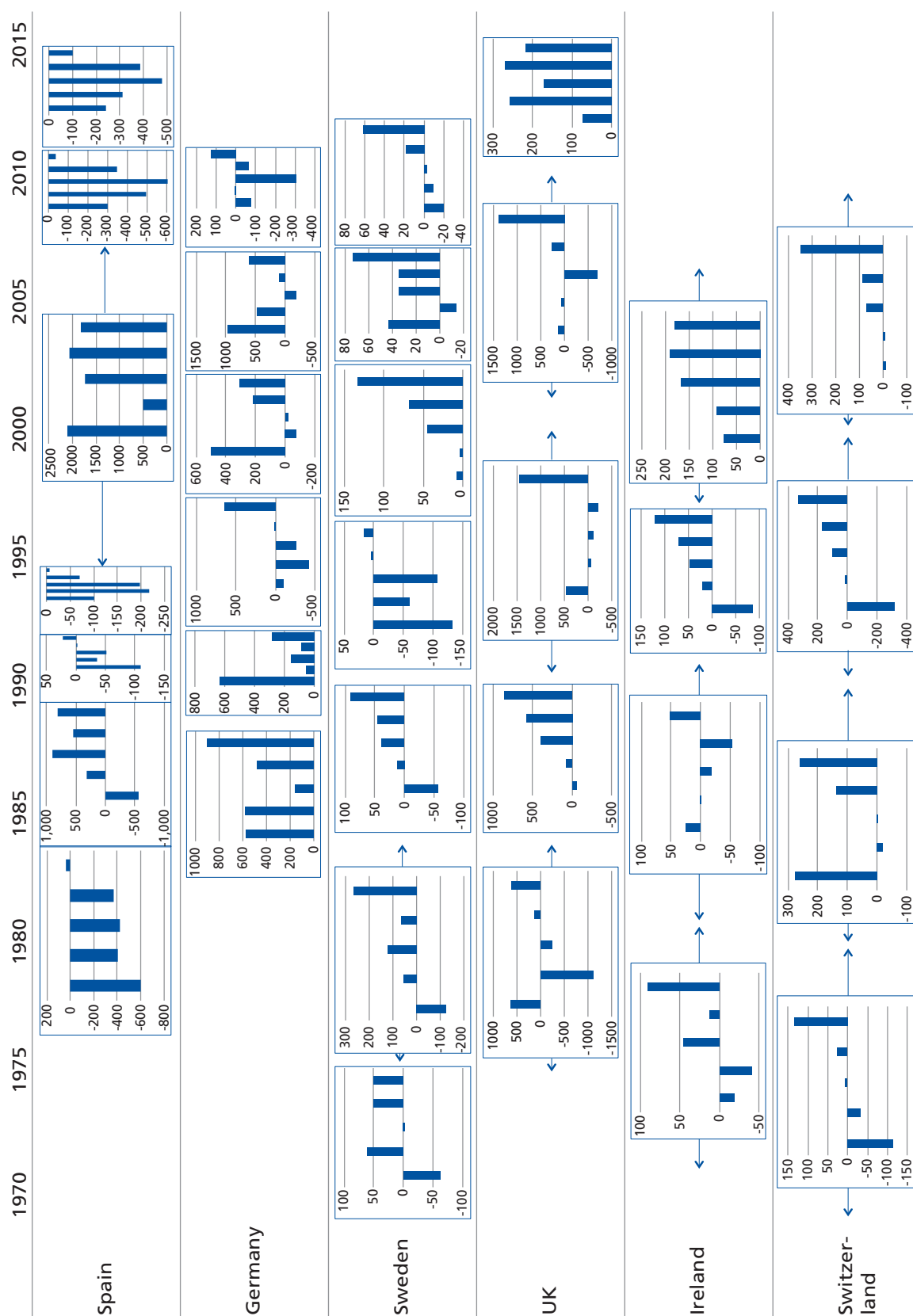
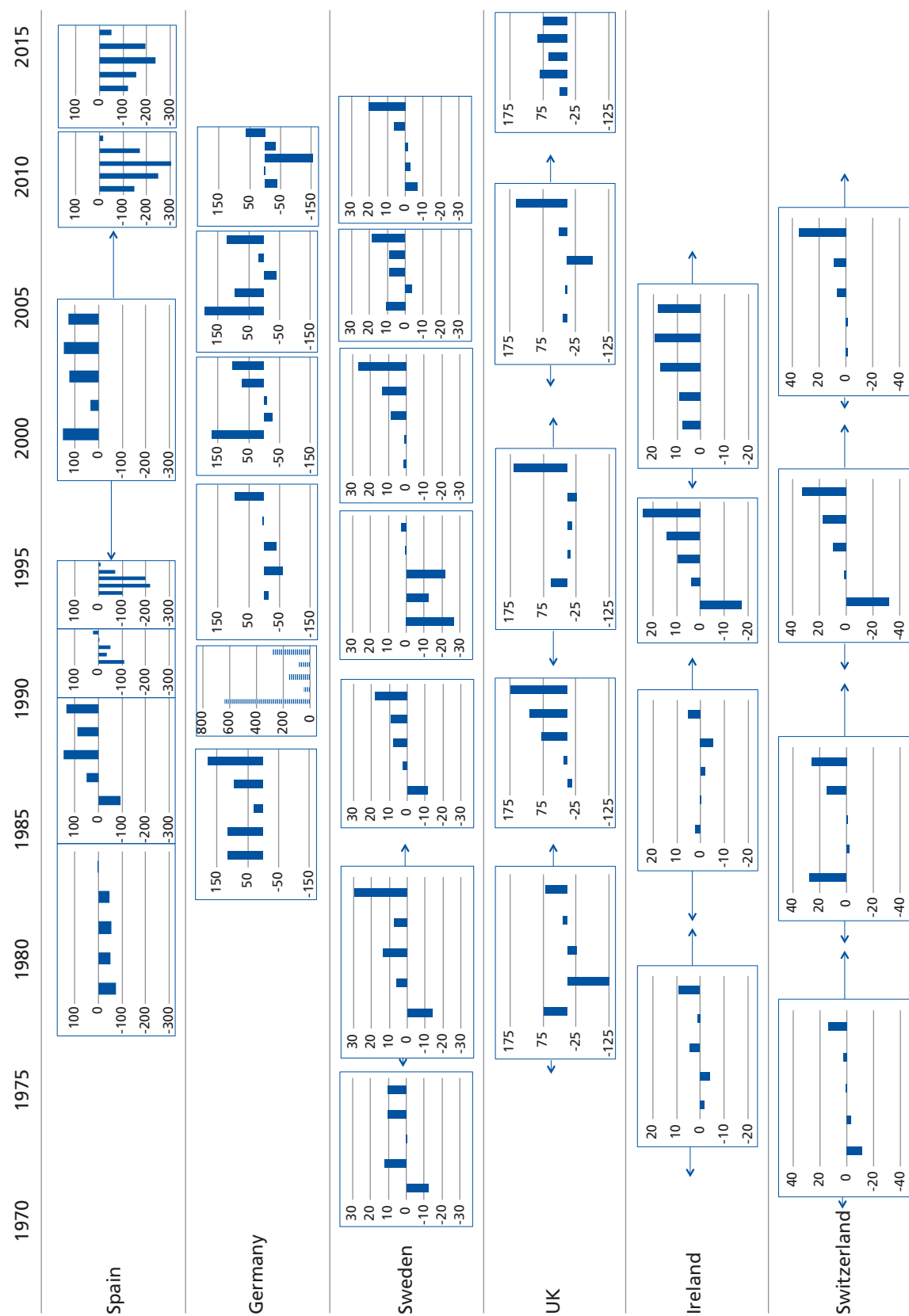


Figure 25: Average annual absolute change (in thousands) in job-wage quintiles in six countries, 1970–2014



Figures 24 and 25 illustrate a number of points.

- In general terms, there seems to be more diversity across countries than across time, at least in terms of the broad similarity of the results to the archetypal patterns of upgrading and polarisation (which remain dominant, as has been consistently found in previous research). With some exceptions, each country seems to be predominantly associated with a variant of either upgrading or polarisation across the whole period. Germany and the UK show a predominantly polarising pattern of occupational change, whereas Spain and Sweden (and to a lesser extent Ireland and Switzerland) show a more-or-less consistent upgrading. Still, as also observed in previous research, upgrading remains the most pervasive pattern. In other words, the top of the job-quality structure tended to grow (in relative terms) quite consistently across countries over the whole period, whereas most of the diversity across countries and time is concentrated in the middle and bottom. It should also be noted that there is an almost complete absence of any pattern of structural downgrading (a relative expansion of the lower layers of employment), with the partial exception of Germany in 1990–1991 (which reflects the expansion of low-paid occupational levels following reunification) and to a lesser extent in 1998–2001 (with a downwards-biased polarisation).
- There is, of course, some variation within the countries themselves across the four decades covered. Perhaps the country with most variation across time is Spain, which experienced a radical process of economic restructuring first and a massive boom-and-bust cycle after the mid-1990s. Spain is where the periodisation most closely follows the cycles, and it uncovers quite significant differences in the boom-and-bust episodes: the periods of recession of the early 1990s and 2008 onwards were intensely polarising, in sharp contrast to a generalised trend of upgrading in the periods of economic expansion (even in the intense restructuring period of 1977–1985, in which there was a large reduction of employment). There is significant variation also in the UK, with alternating patterns of polarisation in 1975–1984, upgrading in 1985–1990, a strongly upwards-biased polarisation in the 1990s and 2000s, and upgrading in the recovery after 2010. Germany and Sweden show rather consistent patterns of polarisation and upgrading over time. Ireland and Switzerland show a consistent upgrading except in the 1980s, where both experienced some form of polarisation.
- Linking these results with the guiding questions of the previous section, one can say that periods of faster productivity growth seemed to be associated with processes of occupational upgrading, irrespective of whether such productivity growth occurred with employment expansion, stagnation or decline. Sweden is a very good example of this, with a high degree of consistency between fast productivity growth and occupational upgrading and hardly any change in overall employment. Job upgrading in Sweden was a shift of aggregate employment from the bottom to the top, with an absolute decline of the former and an absolute increase of the latter. The periods of fast productivity growth in Ireland and the UK after the 1990s are also associated with big expansions of the top occupational layers, very strongly concentrated in the fifth quintile in the UK and more spread across the top three quintiles in Ireland. Overall employment grew very little in the UK, while employment in Ireland expanded massively. The comparative stagnation of real GDP and employment in Germany over the period is linked to the strikingly consistent pattern of polarisation that has already been mentioned: in general, polarisation seems more likely in periods of slow growth, stagnation or recession (see also the cases of Ireland and the UK in the 1980s and the Spanish recessions) than in periods of fast growth in employment or GDP. The strangely flat pattern of Spain in the expansion between 1994 and 2007 (with large expansions

of all but the second quintile)<sup>11</sup> is associated with the similarly flat development of productivity over the same period, reinforcing this interpretation.

- And finally, Figures 24 and 25 may also, to some extent, support the argument of an association between the business cycle and the patterns of structural change, although not very strongly because of methodological limitations. As has already been mentioned, in Spain, where the analysis of structural employment change and the business cycle is better aligned, there is a seemingly clear link (recessions are polarising and expansions are upgrading). In the other countries, the differences do not seem so clear, but the worse alignment between the analysis and the business cycle may preclude finding any such cyclical variation, so it can certainly not be rejected.

### Structural transformation of the economy and shifts in occupational structure

As has been repeatedly argued here, the key structural change of European economies in the period studied was a slow but steady deindustrialisation and the converse increasing dominance of services. This section will discuss the occupational implications of such trends. But there must be some caveats: because different countries are being covered over a long period of time, and the underlying sector classifications are inconsistent except in broad terms, the breakdown analysis is necessarily very rough and only broadly consistent across countries and time. Nevertheless, it should be possible to get a reasonable picture of the overall trends.

Figure 26 shows a breakdown of the patterns previously discussed by broad economic sectors in Germany, Spain, Sweden and the UK. In this case, each quintile bar (representing average annual absolute change and therefore corresponding to Figure 25 above) has been broken down into a series of stacked bars corresponding to the different sectors. Examining these charts suggests the following points.

- The process of deindustrialisation had a generally negative polarising effect on the employment structure of the countries analysed, destroying employment in the middle layers of the occupational structure quite consistently throughout the period in most cases, an effect that is particularly obvious in (but not restricted to) recessions. Of course, there are significant country specificities. In Spain, the secular decline of low-tech manufacturing in particular had a negative contribution to upgrading in the earliest period (destroying employment in low-paid jobs), a stagnant behaviour in expansions and a negative polarising effect in the later recessions. High-tech manufacturing behaved in a more cyclical way, destroying employment in the fourth and fifth quintiles in recessions and creating it in expansions. Similarly, in the UK, deindustrialisation contributed (negatively) to upgrading before the 1990s and to polarisation later (especially high-tech manufacturing). In Germany, manufacturing was more-or-less stagnant in expansions (except a surprising expansion in the earliest period) and polarising in recessions. In Sweden, a consistent decline in manufacturing after 1975 contributed negatively to upgrading until 1996 (destroying low-paid jobs) and to polarisation after 2003 (destroying mid-paid jobs).

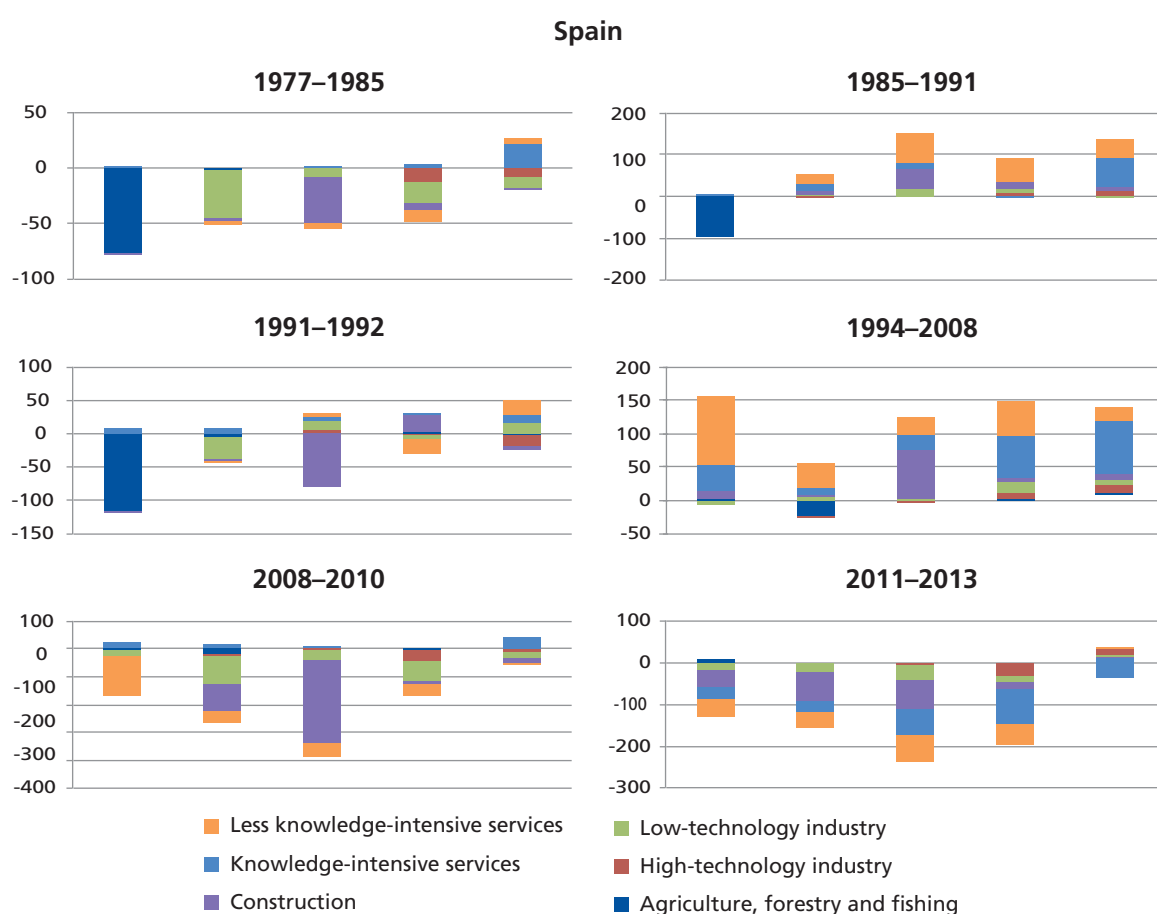
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<sup>11</sup> The strange gap in the second quintile of Spain in this period is partly a methodological artefact. Although the method is generally robust when there are small changes, in some cases the position of a big job between quintiles may be somewhat indeterminate (if it is just around the boundaries between two quintiles, it may be difficult to decide in which one to locate it), which may lead to some inconsistency in the output. The case of Spain between 1994 and 2007 is probably the clearest case of this problem: if the quintiles are constructed on the basis of employment in 2000 rather than 1994 (which in most other cases does not make much difference), the gap in the second quintile disappears, and the overall pattern is one of relatively flat expansion of employment across quintiles, although with some upgrading. The authors feel that that would probably be the most adequate representation of structural employment change in Spain in that period, but for reasons of consistency with respect to the methodology applied in the other countries, the results have been left as they are in Figures 24 and 25.

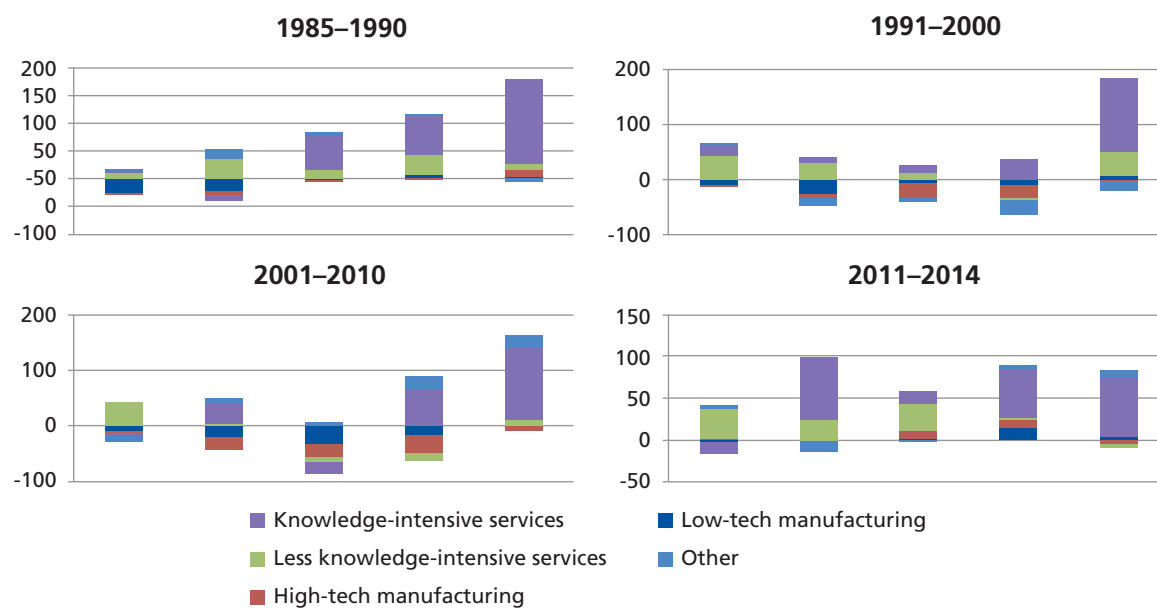


- The expansion of services, which accounted for nearly all employment growth in all countries and periods, tended to be more upgrading than polarising, with some exceptions. In Spain and the UK, where services are broken down by their knowledge intensity (following the Eurostat classification – see Felix (2006) for more details), knowledge-intensive services were consistently positive and upgrading throughout the whole period, whereas less knowledge-intensive services were more likely to expand at the bottom. In Sweden, services contributed strongly to upgrading in most cases, with some exceptions (the expansion of mid-paid service jobs between 1970 and 1975, and the more surprising expansion of low-paid service jobs in 2003–2007). The main exception to this overall pattern was Germany, where services (not broken down by knowledge intensity) contributed positively to polarisation in most periods, but especially in expansions (while in the 2011–2014 recession, polarisation was driven by employment destruction in manufacturing).
- Two peculiarities related to Spain are uncovered by the more detailed sectoral breakdown available in this country. First is the strong cyclical effect of construction on the existence of polarisation or not: in the expansions, it contributed significantly to the expansion of mid-paid jobs; while in recessions – especially after 2008 – it contributed very strongly to the destruction of the same type of jobs. Second is the negatively upgrading effect of the late reduction of the agricultural sector (associated with a significant destruction of low-paid jobs in the first half of the period, until the early 1990s).

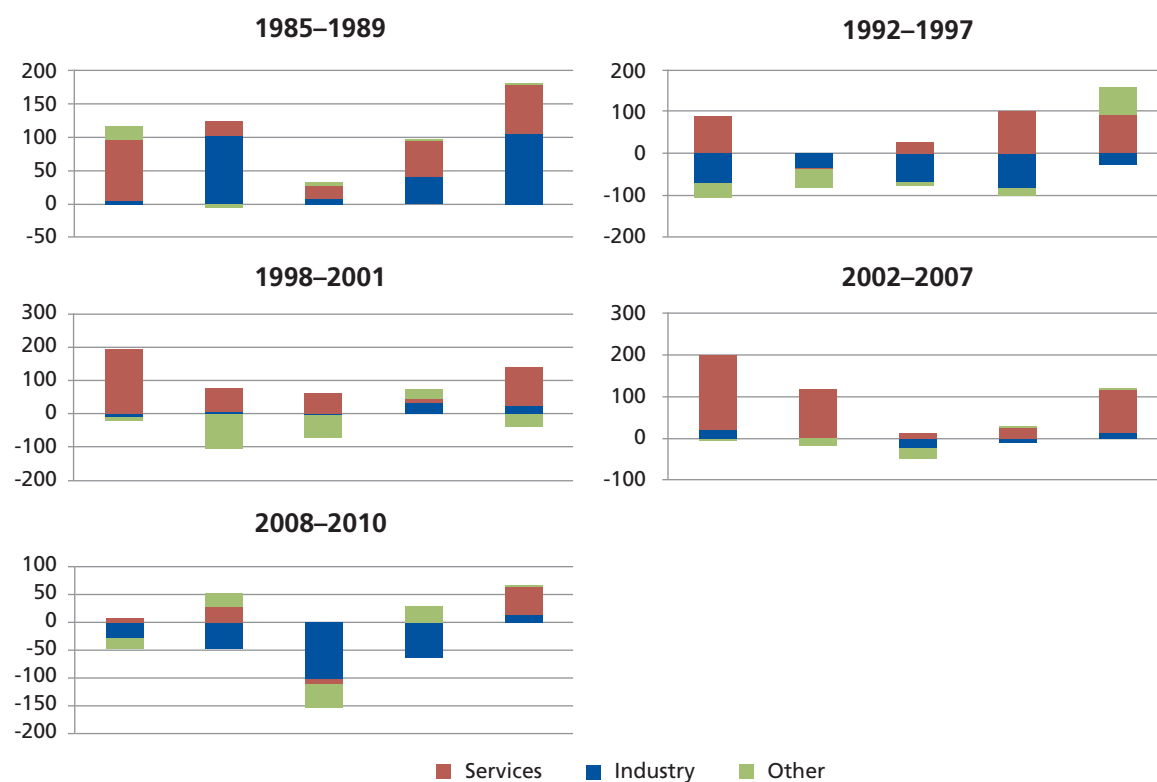
**Figure 26: Average annual absolute change (in thousands) in job-wage quintiles in four countries by broad economic sectors, 1970–2014**

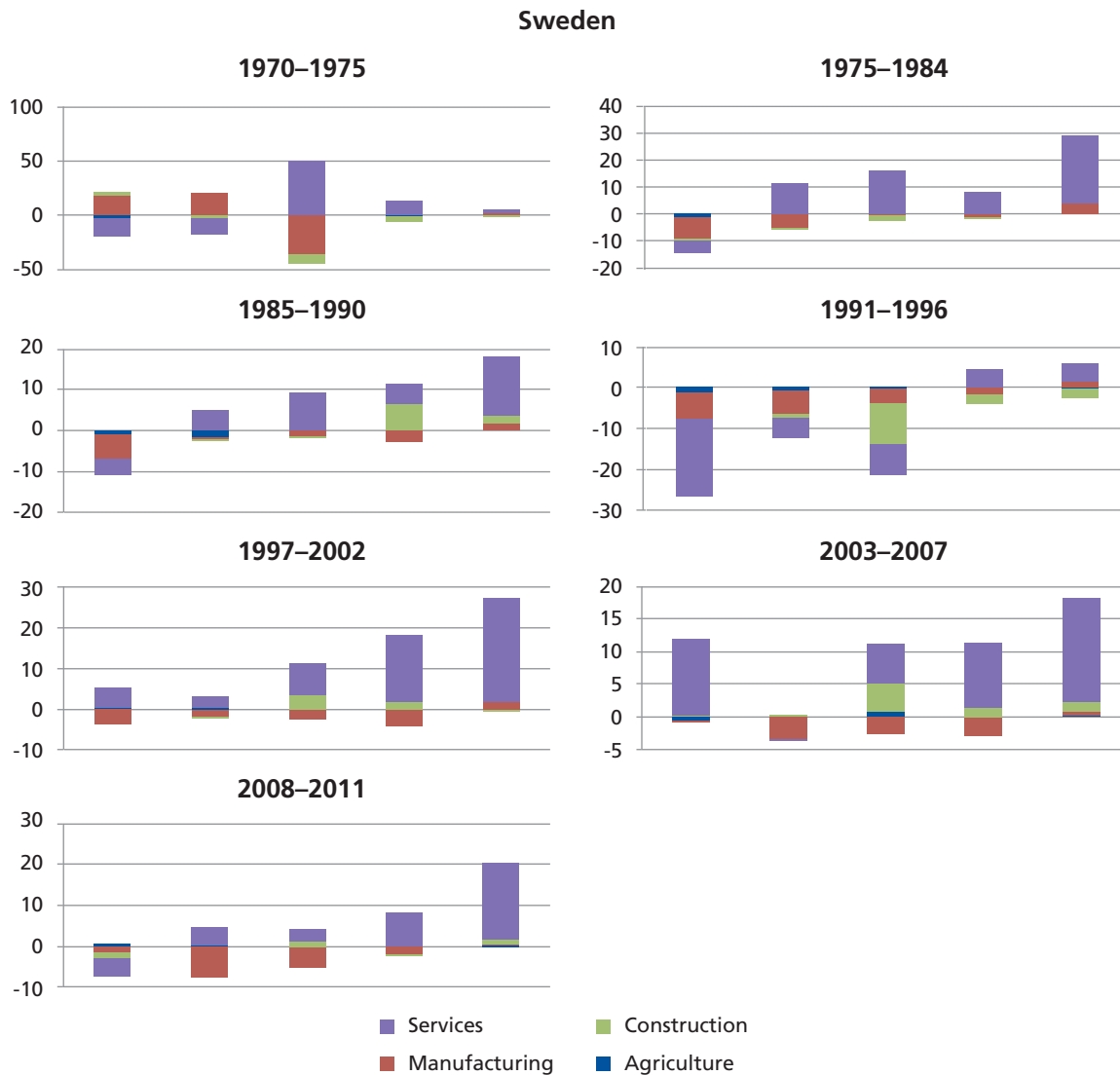


## UK



## Germany

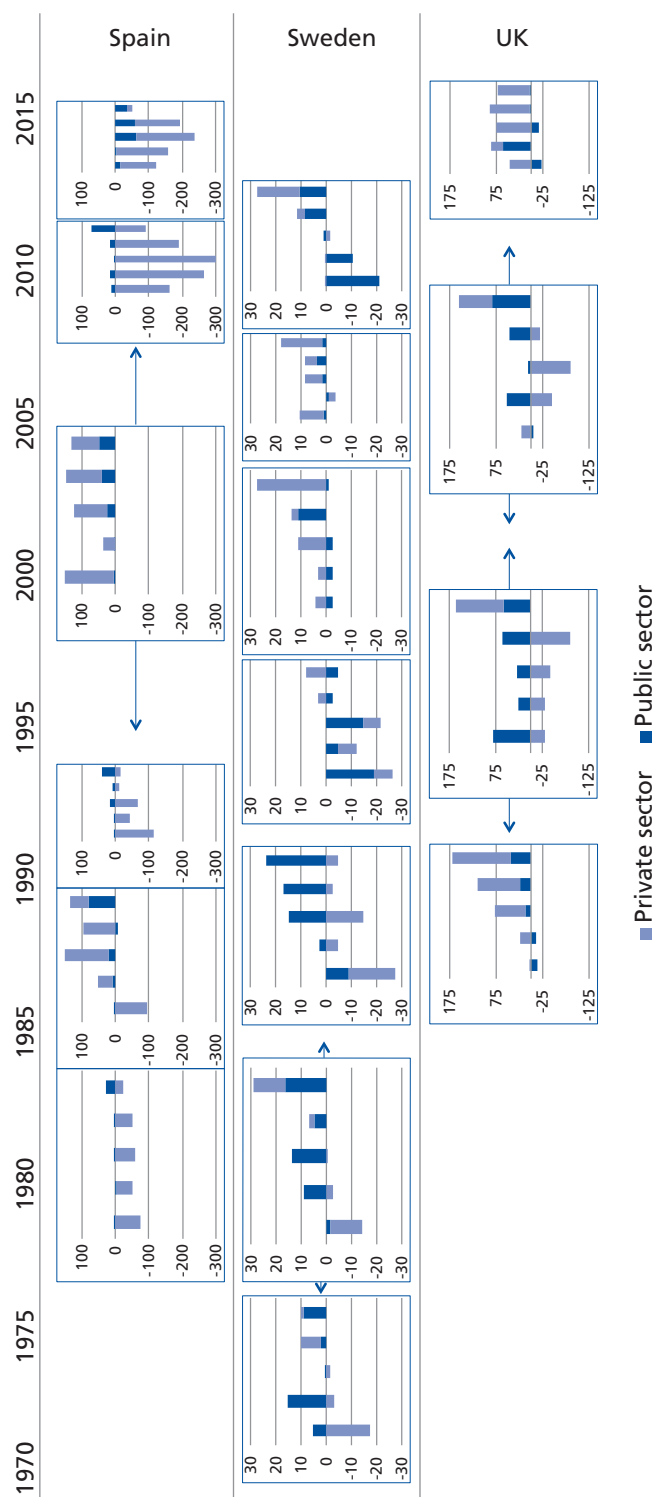




Of particular relevance in terms of long-term structural trends is the evolution of public sector employment, as argued previously. Unfortunately, a consistent breakdown by public and private employment is available in only three of the four countries – Spain, Sweden and the UK – but it shows some interesting results (Figure 27). In these three countries, public sector employment plays a very significant role for the overall development of occupational change.

- The biggest contribution is in Sweden, accounting for most employment growth in the first half of the period (1970–1990), and driving up the expansion of the upper two quintiles, in particular (with the exception of the period 1970–1975, where there was an expansion of public employment in the second lowest quintile). In the first half of the 1990s, this process was drastically reversed with a very large destruction of public sector employment, but this also had an upgrading effect since most of the jobs destroyed were in the first and third quintiles. Between 1997 and 2002, public employment expanded again but much more modestly, with private sector employment driving the continuing process of upgrading. And, interestingly, in the final period covered in this

**Figure 27: Average annual absolute change (in thousands) in job-wage quintiles in three countries, according to public or private sector, 1970–2014**



study, there were significant shifts in public sector employment from the lower to the upper half of the employment structure, with only a limited net impact on overall employment.

- In Spain, the contribution of public sector employment is more modest, but equally consistent and upgrading throughout the whole period. Before 1994, most of the expansion of the highest quintile took place in the public sector, while a sizeable proportion of the jobs created in the three upper quintiles between 1994 and 2007 were public. Even in the first two years of recession, when the private sector was haemorrhaging jobs, the public sector continued having a positive upgrading impact. This makes the reversal of the trend in the second (austerity-driven) period of the recession more significant since, for the first time in recent Spanish economic history, the public sector contributed negatively to employment and with a downgrading effect (destroying jobs in the top three quintiles).
- Finally, the contribution of the public sector in the UK was also quite significant, but not as consistently upgrading as in the other two countries. In the 1980s, public employment had only a very modest but a clearly upgrading impact on overall employment trends. But after that moment, new public sector jobs were as often low-paid as high-paid jobs, with a surprising and significant polarising effect between 1990 and 2010, and a (positive) downgrading effect in the latest period of 2011–2014.

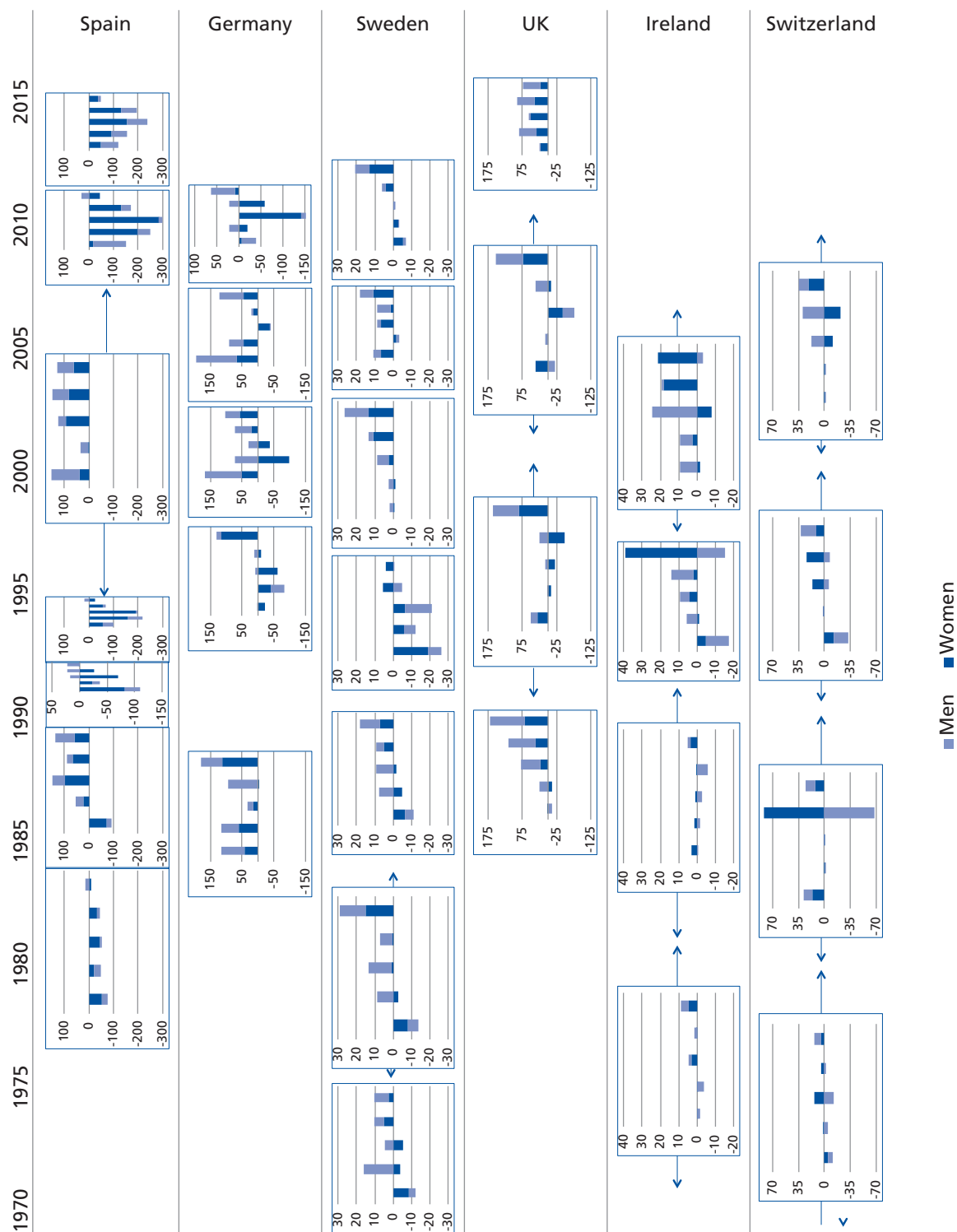
The contribution of the public sector to the observed patterns of structural change seems quite significant, especially since it is rarely discussed in the literature. The debate on the driving forces behind upgrading and polarisation tends to focus on the effect of primarily market forces such as technical change and international trade, which do not seem to apply much to the public sector and yet the role played by the public sector is crucial for understanding overall developments, as has just been seen.

## Progress towards gender equality

The very significant progress towards gender equality in labour force participation is surely one of the most unambiguously positive socioeconomic developments in Europe in the last 40 years. But it would have been seriously circumscribed if the incorporation of women had been limited to the lower layers of the employment structure. At least from an occupational perspective, the results show that this was not the case (see Figure 28). In general terms, female employment expanded at least as much as male employment in the top job-quality quintiles (and in many cases, significantly more), both in absolute and relative terms, and very consistently over time. In fact, there was very little expansion in the presence of women in the lowest quintiles in Spain, Sweden and the UK (with the exception of Spain during 1994–2007, Sweden during 2002–2007 and the UK during 1990–2004). The country that stands out against the rest in this respect is Germany, where there was a very significant expansion of female employment in the two lowest quintiles in three of the periods (in all the polarising ones), even bigger than in the upper quintiles.

The evolution of male employment, on the other hand, was not so positive, and not only relative to female employment (after all, a process of equalisation necessarily means a relative decline in the position of the previously more privileged social category), but also in absolute terms. Figure 28 shows many instances of absolute decline in male employment, which is clearest in recessions (for instance, Spain in the early 1990s or in the Great Recession, Germany between 1992 and 2001 or after 2008, or Sweden in the early 1990s). Such decline is often, though not always, concentrated in the middle layers of employment (except in Sweden, where it tends to be concentrated at the bottom).

**Figure 28: Average annual absolute change (in thousands) in job-wage quintiles in four countries according to gender, 1970–2014**



These gender differences in occupational developments are consistent with previous research that uses a similar methodology but covers shorter periods (Grimshaw and Figueredo, 2012). It reflects, to some extent, the different occupational profiles by gender, but also an interesting link between gender and the structural developments discussed in the previous section. The secular decline in manufacturing and the increasing predominance of services, in particular the expansion of public and social services, are also linked to the long-term decline of the male-breadwinner model and the massive incorporation of women into the labour force. And in terms of the occupational structure, it is also associated with the relative expansion of the upper job-wage quintiles, a development that mostly benefited women in general terms, while the processes of polarisation in recessions tended to affect mostly men.<sup>12</sup>

## Conclusions

This chapter has presented a new study of long-term changes in the occupational structure of six European countries, using new data compiled and analysed at the national level. This is probably the study with the widest comparative coverage using a jobs-based approach to discuss long-term structural change, which puts some of this report's previous results in a different light and allows the discussion to be brought to a higher level of generality.

Perhaps the most striking result of this study is that, although there was a significant diversity in the patterns of occupational change over time, there was even more diversity across countries. In other words, particular countries seemed to be associated with particular patterns of structural change, with few exceptions. Germany, especially, but also the UK seemed to be consistently associated with a pattern of polarisation, in which the top and bottom of the occupational structure (with jobs ranked by their average wages) grow relative to the middle. This is consistent with previous research for those two countries (Goos and Manning, 2006; Spitz-Oener, 2006). In fact, this study's approach shows that, even when the full period of the last four decades is broken down into a number of sub-periods, with the counter set to zero in the beginning of each one, the polarising pattern emerges with surprising consistency. A similar consistency was found in Spain and Sweden, although here it is associated with a pattern of occupational upgrading, and to some extent this is also the case in Ireland and Switzerland.

This relative consistency in the patterns of structural change within each country contrasts with the results of Wright and Dwyer for the US (2003). These authors found that since the 1960s the patterns of structural change in employment in the US went from outright upgrading to unambiguous polarisation, decade after decade. Why would there be more consistency in this report's small sample of European countries? Why was there a clear predominant pattern in each country, with just a few exceptions? The consistency in the patterns of occupational change over time seem to suggest some degree of path dependency, perhaps linked to economic specialisation (which seems plausible in the case of the high-productivity, export-oriented Sweden) but perhaps, more importantly, to the relevance of national employment regimes also in terms of the patterns of occupational change. In this sense, perhaps the shift in the patterns of structural change in recent decades in the US suggests a significant change in the employment regime, whereas the higher consistency in this report's sample of European countries may simply reflect more consistency in the period covered.

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<sup>12</sup> It is important to bear in mind that the expansion of the number of women in the higher-paid occupational levels does not necessarily mean an expansion of the number of women with higher wages. Women can join high-paid occupations but with lower pay levels, which would be associated to an expansion of inequality in wages within jobs. Still, it is important to document the fact that the expansion of female employment is not generally biased towards lower-paid occupational categories, but rather the opposite.

It is important to emphasise that the differences in the dominant patterns of occupational change in the six European countries took place against the background of very similar broad trends of structural economic change. The analysis focused on three particular vectors of structural change: deindustrialisation and the overwhelming dominance of services, the increase of public sector employment, and the feminisation of the labour market. And, although there are some differences in the details, starting points and timing of such transformations, they were broadly extremely similar in all six countries, and yet they were associated with very different outcomes in terms of the changing occupational structure. Of these underlying vectors of change, perhaps deindustrialisation was the most universal in its occupational effects: in most cases, it resulted in a slow but steady contraction of the middle layers of employment, which was generally compensated for by much more significant shifts in other sectors that had more diverse results. The expansion of public sector employment, for instance, was generally linked to the growth of relatively high-paid occupations, but in the UK it also expanded the bottom quintiles after 1990, contributing to polarisation. In general, employment in services grew everywhere and it tended to be upwards biased but in Germany and the UK it also contributed significantly to the expansion of the bottom, while the same process did not occur in Spain and Sweden. The very significant increase of female employment was generally very positive in its broad occupational outcomes except in Germany, where it was strongly associated with the expansion of the bottom quintiles.

Although there was much diversity across countries, some common trends should not be ignored. The clearest one is the relative expansion of the top of the employment structure, which, with very few exceptions, could be observed in all countries and throughout all the periods covered. Conversely, most of the observed variation was in the middle and, especially, in the bottom of the employment structure. What this suggests is that different factors may have affected different segments of the employment structure, with more-or-less universal factors being more prevalent at the top, and more country-specific factors having a bigger influence in the middle and bottom of the occupational structure.

One of the most popular explanations for the consistent expansion of the best-paid and highest-educated occupational layers across developed economies is skills-biased technical change, linked to computerisation and the ICT revolution. But, as happened in the US case, the timing does not fit very well: cases of upgrading and polarisation can both be observed before the 1990s, when computerisation would have already started to have a significant effect on productive structures. So there must be other factors at play. For instance, some evidence has been shown for the effect of the expansion of social services and public sector employment in the countries analysed, which, particularly in the first half of the period, had a very significant impact on overall employment and which contributed to upgrading everywhere – although it contributed to a lesser extent to polarisation in the UK after the 1990s.

Explaining the diversity in the employment developments of the lowest-paid jobs is even more important than explaining the similarity at the top, at least in terms of policy. Why did low-paid jobs grow in net terms in some countries but not so much in others? Since there is (still?) a significant amount of institutional variation across European labour markets, and since labour market institutions are particularly and often explicitly aimed at regulating the conditions of work of those at the bottom of employment structures, the authors have previously hinted at them as plausible factors underlying the observed European diversity in the patterns of occupational change. The results shown in this chapter also point in this direction, but they open new questions too. For instance, it was argued that the pattern of polarisation in Germany in 1995–2007 could be linked to



the deregulating labour market reforms introduced during this period, which were explicitly aimed at facilitating the creation of relatively low-paid jobs to reduce unemployment. But the pattern of polarisation in Germany seems to pre-date such reforms. Is it because there were similar reforms in the previous decade, or because there were other underlying factors that were even more important in the long run?

# Summary of results from the Global Jobs Project

## Introduction

The analysis of employment shifts in the EU Member States using the jobs-based approach has been carried out by Eurofound since 2008; it is a natural next step to extend the analysis both historically and geographically. The previous chapter showed the long-term results from a jobs-based analysis of six European countries, where accessible, good-quality national data allowed developments from the 1970s and 1980s to be charted. This chapter reports the results of a similar analysis of various non-EU countries, although it generally covers shorter, more recent time frames. The data presented arise from a voluntary cooperation initiated by Eurofound in mid-2013 with researchers interested in applying the jobs-based approach to their own national data. The first results from this collaboration, known as the Global Jobs Project, are summarised here and cover draft contributions received from partners covering Australia, China, Japan, Russia, South Korea and the US.<sup>13</sup>

Most of the analysis presented here relates to 1995 and after because data were more readily available. For Japan, however, the data went back three decades to 1982.

## Context

There are some labour market trends common to all countries covered in this chapter, regardless of their stage of economic development. In each, there has been a continuous decline for many decades in the share of primary sector employment (in agriculture and the extractive industries) and – China excepted – also in secondary sector (manufacturing) employment. The corollary has been the expansion of tertiary, or service sector, employment, which accounts for two-thirds or more of employment in most developed countries. In China, the growing service sector has accounted for the largest share of employment among the three broad sectors since 2010–2011 (37% in 2013, up from 13% in 1980). Manufacturing has grown in China, but the service sector has grown faster.

The trend of rapidly declining agricultural employment continues in some developing countries, as it also does in some of the newer Member States such as Romania and Poland. This tends to contribute mechanically to employment upgrading as agricultural employment is concentrated in the lower quintiles of the wage distribution. So the rate of attrition of agricultural employment is an important determinant of employment shift patterns in a given period. As noted elsewhere, the decline of agricultural employment in Germany continued to contribute significantly to lower-quintile employment declines until the end of the 1990s (Oesch, 2013). In China, especially, but also Japan, Russia and South Korea, it is the principal locus of job destruction and one that is heavily concentrated in the bottom quintile.

The jobs lost in declining sectors – whether agriculture or manufacturing – end up being replaced by new jobs in expanding sectors, principally in services. In addition, population growth and increasing labour market participation have increased the overall stock of employment in most countries. Manufacturing drew labour to the cities from the less attractive alternative of agricultural toil; subsequently, the growth of services has absorbed the employment loss caused by deindustrialisation and created more good than bad jobs. These broad sectoral recompositions of employment have, to date, tended to have positive consequences for aggregate quality of employment (as proxied by wage). The growing body of recent research on employment polarisation in developed economies

<sup>13</sup> Contributions covering India and Brazil were not received in time to be included.

suggests, however, that automatic employment upgrading can no longer be taken for granted. The debate is largely framed by empirical findings from analysis using variants of the jobs approach and centres on the extent to which employment is polarising in developed countries.

To date, there is no consensus that patterns of employment shift in the same country or region are stable over time. The pioneering work of Wright and Dwyer (2003) in the US illustrated that different periods of employment expansion in that country were marked by different patterns of employment shift, from more upgrading shifts in 1960s to more polarised shifts in the 1990s. Recent work by Autor makes a comparable observation based on US data during 1980–2007 (Autor, 2010). Upgrading shifts in the first decade make way for more polarised shifts in the 1990s, while the final period (1999–2007) can be characterised as downgrading, with relatively greater employment growth in jobs at the bottom of the wage distribution.

The European Jobs Monitor has observed a variation of patterns between upgrading and polarisation at the broad EU level in its work from 1995 to date (Eurofound 2008a, 2011, 2013, 2014). The pre-crisis employment expansion was primarily upgrading (but with some polarisation), while the crisis and post-crisis period has been more polarising (but with some upgrading). How might the consideration of employment developments in other major economies using the jobs approach help in understanding what is happening in EU labour markets? There are a number of reasons why this might cast some additional light.

- It could clarify whether structural employment change in countries at different levels of development reflect those in the EU and the US. To what extent are differing levels of development and rates of growth important variables in predicting the distribution of employment shifts? Is the hypothesis of skill-biased technological change applicable mainly to post-industrial economies where the ‘service transition’ is in a mature phase? Are there any other examples of downgrading employment shifts that might prefigure a departure from recent patterns that alternate between polarisation and upgrading?
- It could illustrate how changes in the global division of labour – notably in highly tradable sectors such as manufacturing – are affecting aggregate employment quality at national level. For example, the rise of China as a manufacturing superpower is likely to have accelerated pre-existing processes of deindustrialisation in developed economies.
- It could deepen understanding of the links between changes in labour market institutions and shifts in aggregate employment quality – in the countries covered, there are opposing processes of formalisation and regulation of employment on the one hand (particularly in developing countries) and of deregulation on the other hand (principally in advanced countries).

## Methodology

All of the country reports summarised here feature an application of the ‘standard’ jobs approach using national wage and employment data, as set out in the methodological note in Chapter 1. In addition, a common template was agreed for the country analysis. Each report was structured along the following lines:

1. a literature review: the debate on structural employment change and job and employment quality in the country;
2. the national context: the information necessary to understand the analysis and results;

3. methodology: the data constraints and problems of applying the jobs approach;
4. analysis using the common approach including aggregate data by quintile and, where possible, breakdowns by gender and broad sector.

In practice, there were differences in the detail of the approach across countries, some for reasons of sampling frame coverage, some because of difficulties in data access, and others because of the structure of employment in individual countries. As a consequence, some of the national reports were able to provide all of the information prescribed in the template (and more), while others were limited in some respects. Table 4 sets out details of the data sources, periodisation of the analysis, some detail concerning methodological deviations from the standard jobs approach and an indication of the broad employment shift patterns observed.

**Table 4: Details of the jobs-based analysis undertaken**

	Period(s) covered	Data source(s)	Departures from or refinements of common methodological approach	Other comments	Main pattern observed
Australia	2001–2006 2006–2010	Employee Earnings, Benefits and Trade Union Membership survey (LFS-EEBTUM supplement) (Australian Bureau of Statistics)	Analysis excludes self-employed.	Non-trivial data access problems. Sector disaggregated only by public and private sector.	Upgrading
China	2005–2010	Random subsamples of 2005 Population Sample Survey (National Bureau of Statistics, NBS) and 2010 sixth Population Census survey	Different data sources for employment at beginning and end period.	Quintile charts provided with and without sizeable agricultural sector. No gender breakdowns provided.	'Primary upgrading'
Japan	1982–2002 2002–2012	Employment Status Survey (ESS)	Job-wage ranking based on inflation-corrected average of hourly wage at beginning and end year.	Outputs also provided based on job-education rankings.	Qualified polarisation
Russia	2000–2008 2008–2012	Population Survey on Employment Issues (Federal State Statistics Service, Rosstat). Also OZPP 2007 (Survey on Earnings by Occupations) and RLMS (Russian Longitudinal Monitoring survey)	Combining data sources to generate wage ranking due to differences in coverage of wage data sources. Some limited imputation of job-wage cells.	Outputs using various wage and educational job rankings.	Upgrading
South Korea	2001–2008 2008–2013	August supplement of Economically Active Population Survey (APS) (Korean National Statistical Office)	Merging of job cells with fewer than 10 observations to ensure robustness of wage estimates.	Additional analysis provided for 1993–2002 using one-digit industrial and occupational data.	Mainly upgrading
EU	1998–2007 2008–2010 2011–2014	EU-LFS, SES (Eurostat)	Combining data sources to generate wage ranking due to differences in coverage of wage data sources. Some limited imputation of job-wage cells.	EU23 for 1998–2007 (EU28 excluding Bulgaria, Cyprus Poland and Romania), EU27 for 2008–2010 (excluding Croatia), EU28 for 2011–2014.	Polarised upgrading

	Period(s) covered	Data source(s)	Departures from or refinements of common methodological approach	Other comments	Main pattern observed
US	1995–2007 2007–2010 2010–2014	Current Population Survey (Bureau of Labour Statistics)	Job rankings based on median hourly wage for 1995–2014, with quintiles set in 1995 for each period.	Preliminary headline results provided only.	Polarised upgrading

Source: Global Jobs Project national reports

The jobs approach has principally been carried out to date in developed labour markets with a very large share of employment in the formal economy. This is not the case in many developing countries. For example, the informal sector in India – primarily subsistence agriculture – accounts for over 80% of adult employment. The size of the informal economy in many of the developing countries and the fact that official data collection often omits large but hard-to-reach rural populations from survey samples are an impediment to a simple application of the jobs approach. Comparability between countries is also affected by different time frames – an unfortunate necessity arising from the periodisation of the national data sources used, as well as classification breaks in the key occupational and sectoral variables.

In interpreting the different patterns across countries, one must be aware that business cycle developments were regionally distinctive. The global financial crisis, for example, affected all countries but with greater consequences for the US and the EU than for the BRICs and Asian economies. For the Asian economies, the financial crisis of 1997 was as important as the 2008 crisis (if not more) in its negative consequences for output and employment.

Nonetheless, in all countries covered in this chapter, an effort has been made to present a comprehensive picture of employment shifts using official data sources. The next section compares the headline results by job-wage quintile for each participating country and the EU in the chosen time periods. This is followed by an account of broad sector-level developments across the countries. A series of country notes then outlines some of the contextual features of the labour market in each of the countries covered. These are based almost exclusively on the country reports but with some additional supporting references based on desk research. Each country note features particular breakdowns of the headline jobs approach outlined in Table 4 in order to concentrate on country-specific developments of interest:

- regional variations in China;
- differences by contract or employment status in Japan and South Korea;
- by gender and full-time or part-time status in Australia;
- the employment performance of high-tech and more knowledge-intensive sectors in Russia and South Korea.

A brief concluding section summarises the main, necessarily tentative, conclusions.

## Main results

### Aggregate level

The headline results from the different countries and periods show patterns that for the most part resemble those observed in previous applications of the jobs approach: upgrading and polarisation (see Figure 29).

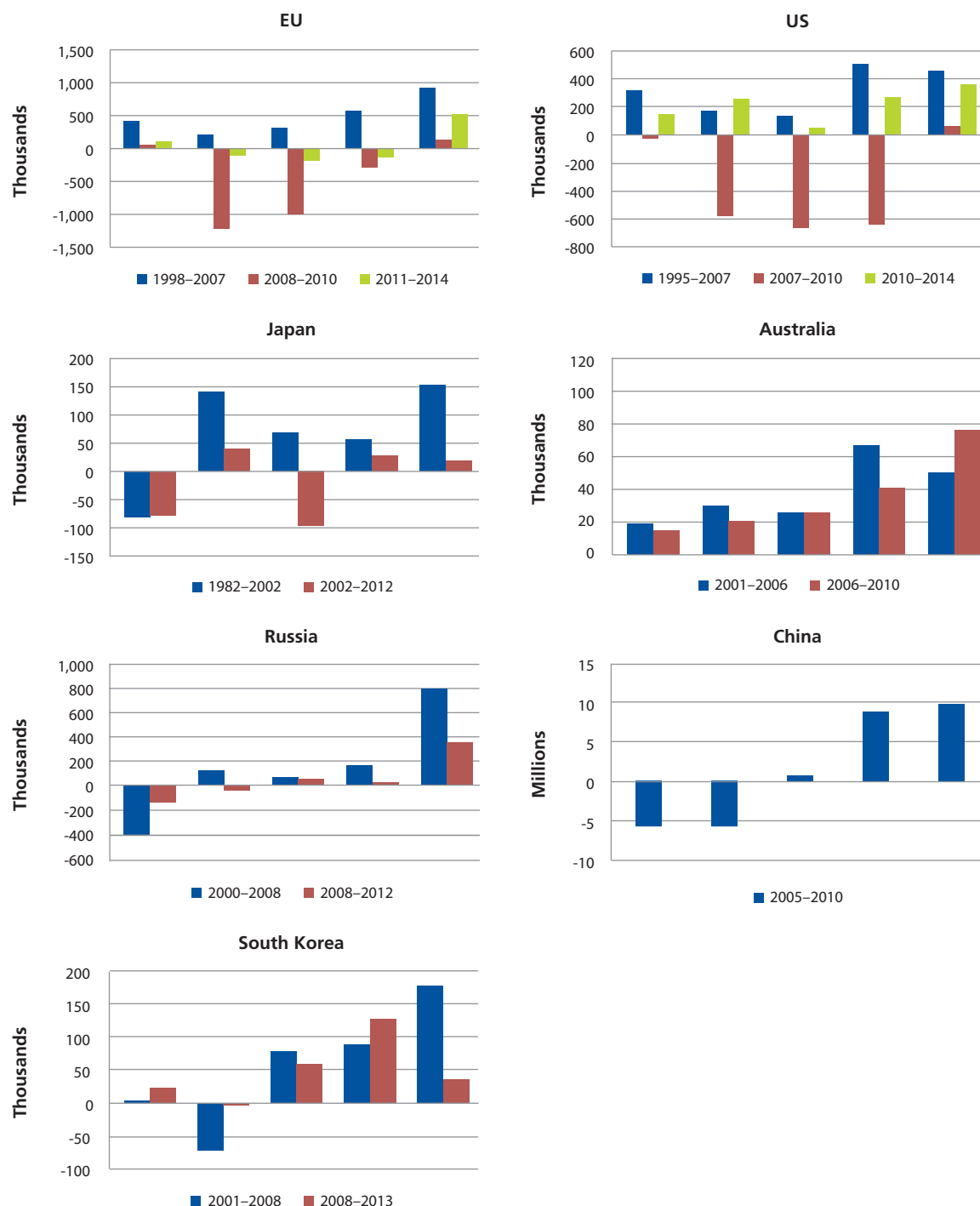
The greatest relative employment growth in two-thirds of the periods covered (10 out of 15) occurred in well-paid, top-quintile jobs. The weakest employment growth was generally in the lower quintiles, although the more developed, lower-growth economies – the EU, Japan and the US – experienced the sharpest declines in mid-paid jobs, notably during recessionary periods. Overall, however, it is clear that employment shifts were positive in quality terms in all periods and more clearly so in the pure upgrading countries.

Unambiguous examples of upgrading employment shifts were evident in Australia and Russia, both resource-rich commodity-exporting countries that enjoyed high growth in the pre-crisis period and in the case of Australia, post-crisis too. South Korea, too, was predominantly upgrading although this was less clear-cut post-2008, with a sharp fall particularly in top-quintile employment growth.

The mature, developed economies of the EU, Japan and the US were characterised by more polarised growth but again skewed to upgrading; in other words, relatively greater growth in the top rather than the bottom of the wage distribution. A key feature was weak growth in mid-paid jobs, partly reflecting stagnation of manufacturing employment pre-crisis and sharp declines in the post-crisis period. Adding to these declines, there were also important contractions in construction employment in Japan after 2002 and the EU and the US after 2008. Both the construction and manufacturing sectors have a concentration of employment in mid-paid jobs in these countries. One thing that emerges starkly from the comparison is the sharp decline in mid-paid employment in both the EU and the US in the immediate post-crisis period. Between 2008 and 2010, jobs in low-mid-paid and mid-paid quintiles shed 2%–3% of employment per annum.

Subsequent employment (and output) growth has been notably stronger in the US compared to the EU, with employment growth across the wage distribution, but the qualitative nature of the shifts has remained similar in both – which this report calls ‘polarised upgrading’, where the key features are relatively fastest employment growth in well-paid jobs, employment resilience in low-paid jobs, and relatively weakest performance in mid-paid jobs.

**Figure 29: Employment shift patterns (absolute per annum) by job-wage quintile in six countries and the EU**



Source: Global Jobs Project national reports

China is exceptional in many ways. Firstly, the scale of employment shifts dwarfs those in the other countries featured. During 2005–2010, the Chinese workforce grew by more than 8 million workers each year, equivalent to EU27 growth for the entire period 2004–2013. The bottom two quintiles, made up almost exclusively of agricultural labourers, each contracted by over 5 million workers

each year. The national report authors refer to this pattern as ‘primary upgrading’, which captures one important dimension of these huge shifts – the movement of tens of millions of rural workers to the cities, with rapidly growing industrial infrastructure and somewhat better-paid jobs, akin to the industrial revolutions of earlier centuries.

Growth faltered in many of the economies covered from an earlier period of high growth to a more recent period of subdued growth. In the EU and the US, the great recession (2007/8–2010) was more clearly polarising than the period before or after the crisis. There are no comparable figures for the other countries for the same short peak-crisis period (2008–2010), but for the somewhat longer periods that are covered, there appears to have been only modest qualitative shifts in spite of slower growth. Only in South Korea can a shift over time be seen, but even here it is from one of clear upgrading to one of more qualified upgrading as growth slowed.

**Table 5: Average real GDP growth per annum (%) in the periods under analysis, in six countries and the EU**

EU	1998–2007	2008–2010	2011–2014
	2.6	-0.6	0.5
USA	1995–2007	2007–2010	2010–2014
	3.2	0.3	2.2
Russia	2000–2008	2008–2012	
	7.0	1.9	
South Korea	2001–2008	2008–2013	
	4.4	3.0	
Australia	2001–2006	2006–2010	
	3.2	3.2	
Japan	1982–2002	2002–2012	
	2.4	0.8	
China	2000–2005		
	9.5		

Notes: 2014 EU data based on Eurostat estimate.

Sources: World Bank, Eurostat

In Russia, the rate of employment change (gross and net) declined, but the overall upgrading shape is very similar in 2008–2012 and 2001–2008, notwithstanding a sharp drop in annual GDP growth (5.1 percentage points). Interestingly, as growth slows after 2008, the pace both of job growth in the top quintile and job destruction in the bottom quintile slows. In Japan, again, the level of net job creation becomes negative in the more recent period (2002–2012), consequent on very weak growth (0.8% average per annum), but the main pattern of polarisation across the top four quintiles and job declines in the bottom quintile remains broadly similar.

Change in the pace of growth within a country appears, therefore, to have had a modest impact on the pattern of employment shift. The main differences observed are between the economies, primarily between those that are clearly upgrading (notably Australia, China and Russia) and those that have seen a hybrid polarised and upgrading pattern (including the EU and the US).



## Sectoral level

In four of the countries covered – China, Japan, Russia and South Korea – quintile employment shifts were broken down by broad sector (the Australian report distinguishes only in terms of public and private sector employment). Some common sectoral patterns emerge from the descriptive analysis.

### 1. Declining employment in the agricultural sector is the main factor explaining negative growth in lowest-paid jobs.

This is notably the case in China. The headline finding of primary upgrading here is based on massive destruction of agricultural employment (around 55 million jobs were lost between 2005 and 2010). The sector also contracted in Japan, Russia and South Korea and, again, these declines accounted for the majority of employment losses in low-paid jobs. The rate of destruction, however, slowed markedly between the earlier and later periods in each of these three countries. In the EU and the US, the main shifts away from agricultural employment, at least at aggregated level, occurred in earlier periods and so are less evident in the quintile charts. In practice, this means that the bottom wage quintile – where most agricultural employment lies – has been more likely to register positive employment growth in the mature, developed economies.

### 2. Manufacturing employment shifts occurred in different parts of the wage distribution in different countries. Levels grew strongly in China, modestly in South Korea but declined in Japan and, sharply, in Russia.

In China, manufacturing employment grew by over 31 million making it the biggest broad sector in terms of growth. These gains were largely recorded in the second quintile, in mid-high-paid jobs.

South Korea is also a major exporting country, with a highly developed and competitive manufacturing base and an increasing trade surplus concentrated in high-tech manufactured products. It has maintained this status and has a manufacturing employment share comparable to that of the EU (16.7% of total employment in 2013), which is contracting at a comparable rate (0.25 percentage points per annum in 2001–2013 after much sharper falls – 0.8 percentage points per annum – in the preceding decade, 1991–2001). Employment shifts within manufacturing have been clearly upgrading, especially during 2001–2008, when the key feature was employment growth in the top quintile in low-technology-intensive industries and, especially, high-technology-intensive industries. Employment destruction in manufacturing has been largely confined to the mid-paid and mid-low-paid quintiles in low-tech industry.

In Japan and Russia, manufacturing employment declined, although these declines were mainly in the lower part of the wage distribution in Japan (the first and third quintiles) and in the upper part in Russia, where the sharpest declines were in mid-high-paid jobs. In both countries, there was positive employment growth in the top quintile in manufacturing, indicative of occupational upgrading in the broad sector (a higher share of management and professional jobs).

In the EU and the US, deindustrialisation has tended to destroy employment in the middle of the wage distribution, contributing to polarisation even if developments in the service sector have been numerically more important in this respect.

**3. Construction sector employment was an important component of employment growth, especially in periods of higher growth and in countries with higher growth.**

Construction added 17 million new jobs in China between 2005 and 2010. It grew also in Japan, Russia and South Korea but only in the earlier, higher-growth, periods covered. There was quite a variation across countries in how relatively well construction sector jobs were paid. In Japan, they were mid-paid jobs – as generally is the case in the EU as well – and in South Korea, they were concentrated in mid-high-paid jobs. In China, as a result of the compression of all non-agricultural employment into the top three quintiles, they were shared between the mid-paid and mid-high-paid quintiles. Most idiosyncratic of all, in Russia nearly all construction sector employment growth during the high-growth period (2000–2008) was in the top quintile. Workers in the sector enjoy ‘additional pecuniary compensations for working in hazardous conditions or in unfriendly climate(s)’, according to the authors. Mining and transportation jobs, presumably for similar reasons, tend also to be in higher quintiles in Russia.

Because of its sensitivity to the business cycle, construction has tended to have a disproportionate impact on aggregate employment shifts in the short and, sometimes, medium terms. In the EU and the US, where work in the sector is predominantly in mid-paid jobs, rapid rises in construction sector employment during periods of employment expansion have tended to disguise underlying polarisation, while equally sharp declines during recessions have accentuated polarisation. It is likely that these effects were, in turn, exacerbated by financial deregulation and increasing flows of credit to the property sector.

**4. Strong private services employment growth mainly in less knowledge-intensive services in China and Russia and in knowledge-intensive services in other countries and the EU.**

In China, the retail sector experienced the second largest rise in absolute employment of any broad sector (the largest having occurred in manufacturing). Around 22 million new jobs were created in 2005–2010.

In Russia, too, this was a particularly fast-growing sector. Annual employment growth of the broad market services sector (about 600,000 net new jobs) was some three times higher than that in the public or non-market services sector, and four times the rate of destruction of manufacturing employment. This growth was mainly in well-paid jobs.

The primary factor driving Russian employment upgrading over the period was, according to the authors, ‘the structural shift from the production of tradable to non-tradable goods’. It was a period of accelerated transition to a service-based market economy from one with a comparatively low services base and which had only recently abandoned central planning. This was accompanied by a very rapid rise in real earnings (10%–15% per annum) and was supported by supply factors, such as a rapid expansion of tertiary education.

As the authors indicate, ‘different institutional foundations [...] demand different occupations and skills and therefore ultimately affect the economy-wide composition of jobs [...]. The transformation radically increased and modified flows of information, and created a large and growing demand for workers who absorb and process all types of data [especially] white collar occupations such as managers, lawyers, accountants, journalists, economists.’ Demand for these skills had been ‘extremely low under central planning and sharply jumped with the start of the transition’.

The process of catch-up growth in the commercial or trading sectors continued throughout the 1990s and 2000s, according to the authors of the Russian report, as appears also to have been the case in China. Increased retail employment was, in any case, a predictable consequence of higher growth, increasing prosperity and rising consumption in countries with fast-opening market economies.

In Japan and South Korea, employment growth was again concentrated in services, especially in the earlier higher-growth periods, but this tended to be quite dispersed across the wage distribution in both countries. Knowledge-intensive services have accounted for the overwhelming majority of top-quintile employment growth in the EU and the US.

## 5. Large cross-country variation in public services employment

There were contrasting patterns in public services employment.

In South Korea, one of the main developments since 2001 has been the large expansion of primarily state-funded sectors. A large expansion of state welfare provision increased employment in education and public administration in 2001–2008 (especially in top-quintile jobs) and in the health and social work sectors after 2008 (mainly in the middle and bottom quintiles).

Growth in top-paying jobs in Japan was also attributable in large part to increases in public administration employment, especially in the earlier period. Health service employment has also grown strongly, unsurprisingly for a country with a rapidly ageing population. A significant difference from the EU is that health sector employment growth was heavily concentrated in relatively low-paid jobs; in the EU, it has been generally in mid-high-paid and high-paid jobs. This suggests that much of this net new employment has been in less skilled, personal care occupations.

One characteristic of public sector employment in Russia, noted by the country report authors, is that it is relatively low paid, accounting for 40% of bottom-quintile employment, for instance. Nonetheless, growing employment in non-market services, especially pre-2008, was concentrated in mid-high-paid jobs (fourth quintile), so public service employment tends to grow faster in higher-paid, higher-skilled roles.

Public sector employment in Australia is concentrated in the top two quintiles. While one in five employees works in the public sector, it accounts for over 40% of top-quintile, well-paid employment, over 30% in the fourth quintile with a monotonically decreasing share moving towards the bottom quintile (where it accounts for 6% or less, depending on period). Employment growth was more-or-less evenly distributed between public and private sectors as per starting shares in the earlier period, 2001–2006. The second period (2006–2010), however, was marked by a sharp decline in the public sector share of employment across all quintiles. In absolute terms, public sector employment also declined (by 69,000 jobs), with the sharpest declines in mid-paid and mid-low-paid jobs. Only private sector employment grew in this period.

In China, the only public services sector to feature in the sector disaggregation – health and social welfare – contributed very modestly to overall employment growth.

In summary, behind some common trends – declining agricultural employment, increasing share of services employment and increases in aggregate employment quality – there are significant variations across the countries in the sectors that contributed most to net employment growth and destruction and where in the wage distribution these growing or declining jobs were most likely to be found.

The next section looks more closely at some of the contextual and labour market institutional features in each country that may further clarify the headline patterns of employment change presented so far.

## Country notes

### China

The inclusion of China in this comparative analysis adds greatly to the interest of the project. It is the most populous country in the world, accounting for nearly one in five of the global population. It has transformed itself in a generation from a large, centrally planned, autarchic economy, mainly based on subsistence agriculture, to the industrial workshop of the world and its greatest goods exporter. This transformation has resulted in China becoming the second-biggest economy in the world, with an average annual growth rate of 10% over the last three decades. Living standards and longevity have risen largely in line with economic output. Real wages nearly doubled between 2001 and 2010 but were still outpaced by productivity improvements.

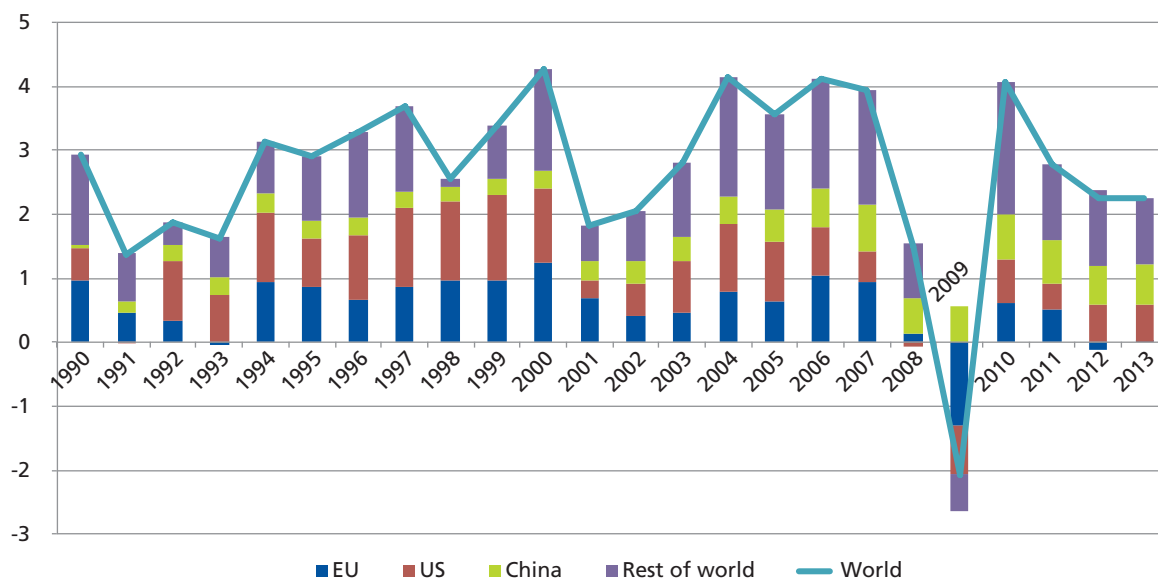
This transformation was accompanied by a rapid phase of urbanisation such that over half of the population now live in cities (up from around 20% in the pre-reform years of the 1970s). The integration of the Chinese workforce (around 760 million workers in 2013, nearly twice as many as the EU and the US combined) has been the main factor in the ‘great doubling’ (Freeman, 2008) of employment in the global market system. This has been marked by a huge expansion of the manufacturing sector but significantly also by an even faster rise in the service sector, both in output and employment. The tertiary sector accounted for 37% of employment in 2012, compared with 31%–32% for the primary sector and for manufacturing and construction combined.

A transformation of this scale has ramifications, of course, well beyond Chinese borders. China accounted for 8.5% of all EU exports in 2013 and exports to China have been growing annually by 16% in recent years. On the other hand, cost competition from low-cost countries, especially China, has resulted in a significant offshoring (direct and indirect) of manufacturing output and employment from developed to developing countries. The ratio of value of goods imports to exports from the EU to China, for example, is around 2:1, although this has contracted since 2008 because of a slowdown in Chinese imports and an increase in EU exports to China (European Commission, 2014).

The impact of the global financial crisis was mild on the Chinese economy compared to that in the EU and the US. A significant programme of economic stimulus in 2009–2010, accompanied by a policy more oriented towards domestic consumption, helped cushion the Chinese economy against the impacts of its heavy reliance on external trade. The sheer scale of the Chinese economy enables it to withstand global shocks. Annual growth has never fallen below 3% since the beginning of the modern transformation of China in the late 1970s. Even during the global financial crisis, annual growth declined from 14% to a still ‘tigerish’ 9% in 2009.

The growing contribution of China to global output growth is evident in Figure 30. The share picked up markedly after 2001 when China was admitted as a member of the World Trade Organisation.

**Figure 30: Contributions to global GDP growth (% per annum) from different countries and regions**



Source: World Bank (2014) (author's elaboration)

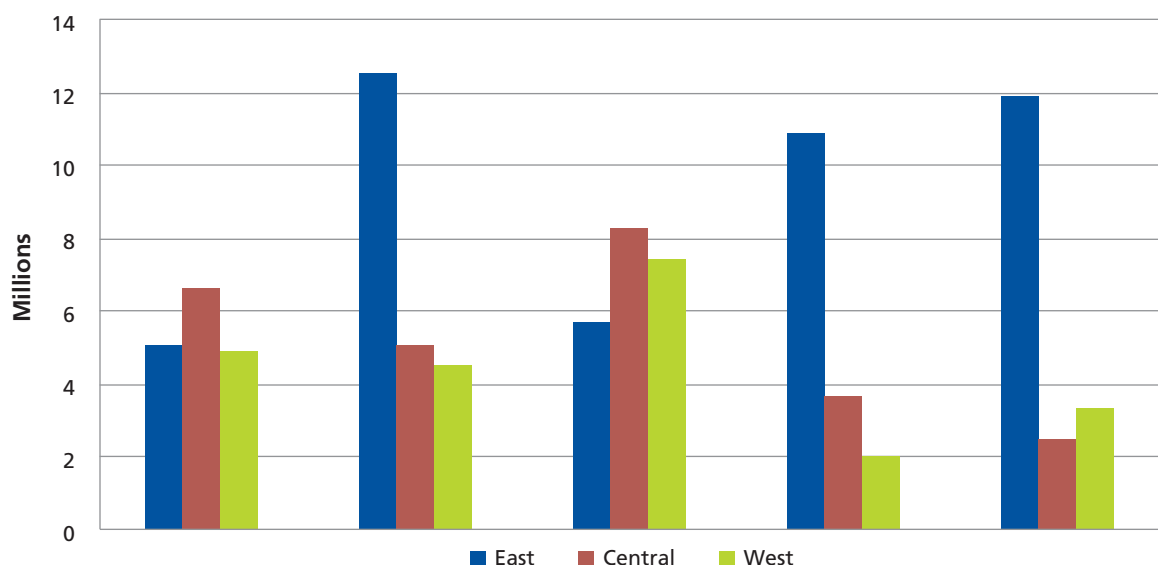
The authors of the Chinese report underline a number of potential obstacles to future Chinese economic growth.

- The 'almost endless supply of rural labour' that has fuelled the Chinese economic miracle is rapidly contracting. The authors indicate that '90% of the young rural workers that are less than 30 years old are employed in non-agricultural sectors'. Additionally, as a result of the one-child policy, the population growth rate has moderated sharply from +15 per thousand annually in the early 1980s to +5 per thousand in 2014.
- As a result of declining supply and higher wages, the low-cost production model of Chinese manufacturing export faces cost challenges from other emerging economies. Declining cost differentials with developed economies are also undermining the rationale for offshoring from higher-GDP countries.
- There are increasing imbalances and inequalities within China: regionally, with the east growing faster than the west; socially, as a consequence of a rural–urban divide formalised in the *hukou* permanent resident registration system; and economically, in terms of increasing concentrations of wealth, reflected in a high Gini coefficient for income inequality (0.47 in 2012, somewhat higher than the US coefficient of 0.45 and much higher than the EU coefficient of 0.30). The report authors also identify a related problem of educational polarisation along the rural–urban divide.

While the Chinese employment structure analysis is based on a relatively short period (2005–2010), there is a strong likelihood that the main patterns identified reflect longer-term changes going back to the beginnings of the modernisation of the Chinese economy in the Deng Xiaoping era (1978–1992). While the level of employment growth has slowed somewhat in the last 10 years compared with 1980–2004, the Chinese labour market still added around 40 million new jobs in 2005–2010. As

already discussed, this was the result of a massive reallocation of labour from the countryside to growing cities, and from agricultural employment to services and manufacturing employment.

**Figure 31: Employment shifts by job-wage quintile and region, China, 2005–2010**



Note: Excludes agricultural employment

Source: China national report

An important finding relates to the regional variation in patterns of employment growth (see Figure 31, which excludes developments in the agricultural sector). As indicated, the Chinese economic miracle has been accompanied by a widening disparity in regional economic performance and wealth. The eastern provinces have urbanised faster, have benefited most from internal migration flows and have accounted for a much larger share of Chinese manufacturing growth than central or western provinces. GDP per head in the big cities of the east is approaching developed-world levels (above USD 13,000 in 2012 in the city regions of Beijing, Shanghai and Tianjin) and is some four times the level recorded in the poorer western provinces. Developments in the employment structure reflect these differences. In absolute terms, also, the net gains in employment are heavily weighted towards the eastern provinces, which contributed 31.3 million of the total net national employment gain of 39.1 million in 2005–2010. The eastern provinces also benefited disproportionately in terms of the growth of well-paid employment (in the top two quintiles). Behind these figures is what the authors describe as ‘the largest population migration in [...] human history’, urban employment having increased from 100 million in 1978 to around 380 million in 2014, much of this increase deriving from internal migration flows. The working-age migrants – notwithstanding the barriers of the *hukou* system – have been attracted by the prospect of more and better-paid jobs.

The regional variation in employment shifts is an indication that Akamatsu’s Flying Geese pattern<sup>14</sup> of industrial upgrading may be replicating itself within China, in what the authors refer to as ‘sequential

<sup>14</sup> Identified by Japanese economist Kaname Akamatsu, this refers to a model of the international division of labour within Asia where a lead nation, in this case Japan, will draw other regional economies up the development ladder in its wake as increasing labour costs in the lead country necessitate transfer of labour-intensive activities to nearby countries. Developed originally in the 1930s, Akamatsu’s theory envisaged four tiers of Asian economies, with Japan the lead goose, South Korea, Taiwan and others in the second rank, and China in the rearguard.



upgrading'. According to this hypothesis, increasing labour costs in the eastern provinces will drive restructuring towards more capital-intensive, higher-productivity manufacturing and services, while more labour-intensive manufacturing will transfer to the central and western provinces. The relatively faster growth of higher-paid employment in the eastern provinces offers some support for this theory, although the national report does not include more detailed sectoral breakdowns of employment shifts at regional level that might serve as corroboration. What the authors stress is that a certain model of growth based on abundant labour reserves has run its course and that future growth will 'rely more on productivity improvement and [that...] economic restructuring and industrial upgrading will accelerate'. If this scenario plays out as anticipated, 'employment opportunities will mainly be found in jobs at the high end of the value chain'.

## Russia

The Russian labour market in the first decade of the new century represents a particularly interesting object of study for a jobs-based analysis. The period from Russia's 'second revolution' in 1991 until the global financial crisis was one of wrenching transformation from a centrally planned to a more market-based economy, followed by rapid economic growth in the early mid-2000s.<sup>15</sup> The 'great contraction' between 1991 and 1998 saw a 40% cumulative decline in GDP. In contrast, output almost doubled between 1999 and 2008. Real earnings rose in tandem as surging commodity exports laid the basis for an accelerated transformation of the employment and productive structures. The Russian national report covers the latter period and the years after the global financial crisis up to 2012. Even though this period featured strong growth, and change was less traumatic than in the immediate post-transition years, according to the authors there continued to be a 'massive reallocation' of employment across occupations and sectors. Declining employment in agriculture and manufacturing was more than compensated for by a sharp rise in services employment. Through the prism of job-wage quintiles, these employment shifts were unambiguously upgrading.

The authors of the Russian national report underline how unique the Russian post-transition adjustment was in many respects, even by comparison with Soviet satellite countries in eastern Europe. For example, employment destruction in the 1991–1998 period was much more limited in Russia. For each 3 percentage points of GDP decline, only 1 percentage point of employment was destroyed. The same elasticity was closer to one in the central and eastern European countries. Low wage floors and high levels of wage flexibility were two important employment buffers; earnings lost almost two-thirds of their real value during the post-transition slump.

To an extent, these buffers are also evident in Russian employment data after 2008. Net employment growth slowed (from an increase of 720,000 per annum average in 2000–2008 to an increase of 230,000 in 2008–2012) but was on average positive over the four-year period despite, for example, a sharp fall of 7.8% in GDP in 2009 after the global financial crisis. One distinctive feature of the Russian data is that the pre-crisis employment expansion was 'associated with the acceleration of economic restructuring while the crisis events of 2008–2009 caused [...] a deceleration'.

The upgrading of the employment structure in Russia was especially concentrated at the margins, with most of the net employment shifts occurring in either the bottom or the top quintiles. The gains in the top and the declines in the bottom quintiles were especially noteworthy in the earlier period, with average net employment gains in the top quintile, for example, just over 570,000. Thereafter,

<sup>15</sup> An extension of the analysis back to 1991 would be even more interesting, but no fully comparable labour force survey data were available for the pre-2000 period.

while the upgrading pattern persisted, the scale of gains and declines by quintile was much more modest. The middle three quintiles saw comparatively marginal changes in both periods.

The gender employment gap is narrow in Russia (51% of the workforce being men and 49% women in 2012), but this legacy of the Soviet era emphasis on the equality of labour market participation is not reflected in wage levels (Atencio and Posadas, 2012). The gender pay gap is among the highest in the developed world. This has its counterpart in a skewed gender distribution of employment across the job-wage quintiles, with 70% of top-quintile employment being male, and female workers accounting for 56%–70% of employment in the bottom three quintiles.<sup>16</sup> Male employment gains, especially in 2000–2008, were concentrated in the top quintile, while female gains were distributed across the top four quintiles, albeit with an upward skew. Job destruction in low-paid, bottom-quintile jobs was more or less equally shared by gender. In the period of more modest employment growth post-2008, the female share of top-quintile employment growth has increased but remains below 40%, much lower than in the EU where, over the same period, women have accounted for the majority of employment growth in well-paid jobs.<sup>17</sup>

So the picture in Russia was one of clear, unambiguous upgrading, persistent over both periods covered although somewhat stronger pre-crisis. The authors indicate some potential caveats to their empirical findings – the absence of migrant workers in the data source used for employment estimates and the likely inflation of wage estimates for some fast-growing jobs in the market services sector where the data used covered large and medium-sized firms only – but estimate that these would affect only the degree of upgrading and not its essential character.

Because of the specific historical circumstances of the post-transition Russian labour market in the 1990s and 2000s, the national report authors argue that skill-biased organisational change probably played a more important role than skill-biased technological change as a driver of changes in the employment structure, notably the growth in well-paid jobs.

Figure 32 shows the modest contribution of high-tech services and negative contribution of high-tech manufacturing to employment growth. However, even in the top quintile, more net new employment was created in less knowledge-intensive services (retail in particular) and low/medium-low tech manufacturing.

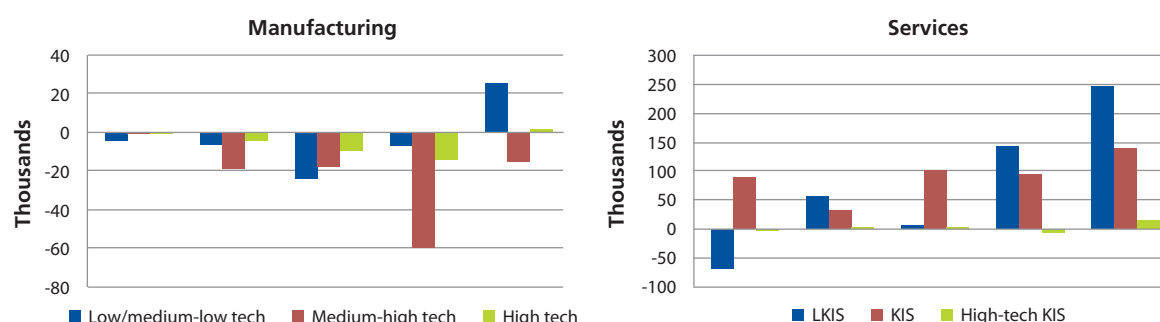
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<sup>16</sup> The Russian national report authors also note that ‘Russian men have a positive gender earnings gap but a negative educational one’; in other words, women are over-represented in jobs with higher average qualification levels. Something similar is observed in the EU, but it is largely confined to the younger cohort; in Russia, it is observed over the whole age range, a further legacy of Soviet-era gender policies.

<sup>17</sup> An important limitation of the jobs approach is that where individual jobs are ranked on the basis of median or mean hourly wage of all workers in the job, it is blind to intra-job variation of wages. For this reason, even where women account for the majority of employment growth in well-paid jobs, if they earn less on average than their male counterparts in the same job – as is mainly the case – there is no necessary impact in terms of narrowing the gender wage gap.



**Figure 32: Annual average employment shifts in services and manufacturing by job-wage quintile, Russia, 2000–2012**



Source: Russia national report

Rapid expansion of information technology skills and employment in the 2000s offers some support to a more conventional explanation of shifting patterns of employment in Russia based on skill-biased technological change. But this has to be juxtaposed with evidence that the technological and industrial infrastructure in Russia deteriorated post-transition, especially in the 1990s. This trend weakened but did not reverse during the high-growth 2000s. As the authors write, ‘the fact that the most technologically advanced industries employed little [sic] labour force also speaks against the SBTC [skill-biased technological change] hypothesis’. This is ironic, as the observed pattern of employment shift in Russia from 2000 to 2012 mimics the theoretical prediction of skill-biased technological change.

The authors conclude by outlining possible future developments in the Russian employment structure. They indicate that these are highly unlikely to repeat the positive patterns observed during 2000–2012.<sup>18</sup> Deteriorating demographics will see a decline in labour market participation and employment levels. The rate of human capital enhancement is likely to slow down and catch-up convergence with developed country shares of employment by occupation and industry is largely played out. Room for further positive, upgrading shifts is therefore limited.

### South Korea

South Korea is one of the countries in which there are recent examples of jobs-based analyses of shifts in the employment structure. Employment polarisation emerged as an issue of policy interest in South Korea in the 2000s. This was prompted by studies showing possible labour market determinants of growing income inequality in the aftermath of the 1997 Asian financial crisis. This crisis, more severe in its local impacts than the global financial crisis 10 years later, resulted in a sharp fall in GDP of 5.7% in 1998. There was a related concern that labour market flexibilisation, for example the deregulation and expansion of the temporary agency work system, was contributing to inequality.

The incidence of low-wage work in South Korea (25%) is among the highest of the OECD countries (and is the same as the US). The country is also among the highest in terms of earnings dispersion (OECD, 2013). Earlier work using a jobs-based approach with two-digit sector and occupational data found employment polarisation in 1993–2000 and, to a lesser extent, in the later, shorter period 2000–2004 (Cheon, 2006). The analysis was, however, restricted to salaried employees only,

<sup>18</sup> It is worth adding that these predictions pre-date the huge drop in oil prices of late 2014 (oil and natural gas account for 68% of Russian exports) and the Ukrainian ongoing unrest that began in the same year.

excluding the sizeable self-employed population in South Korea. Later analysis using one-digit data observed top-skewed employment growth (upgrading) in 2000–2008, followed by greater relative growth in mid-paid jobs in 2008–2012 (Sung, 2014), more in line with the findings of the South Korean report for this project.

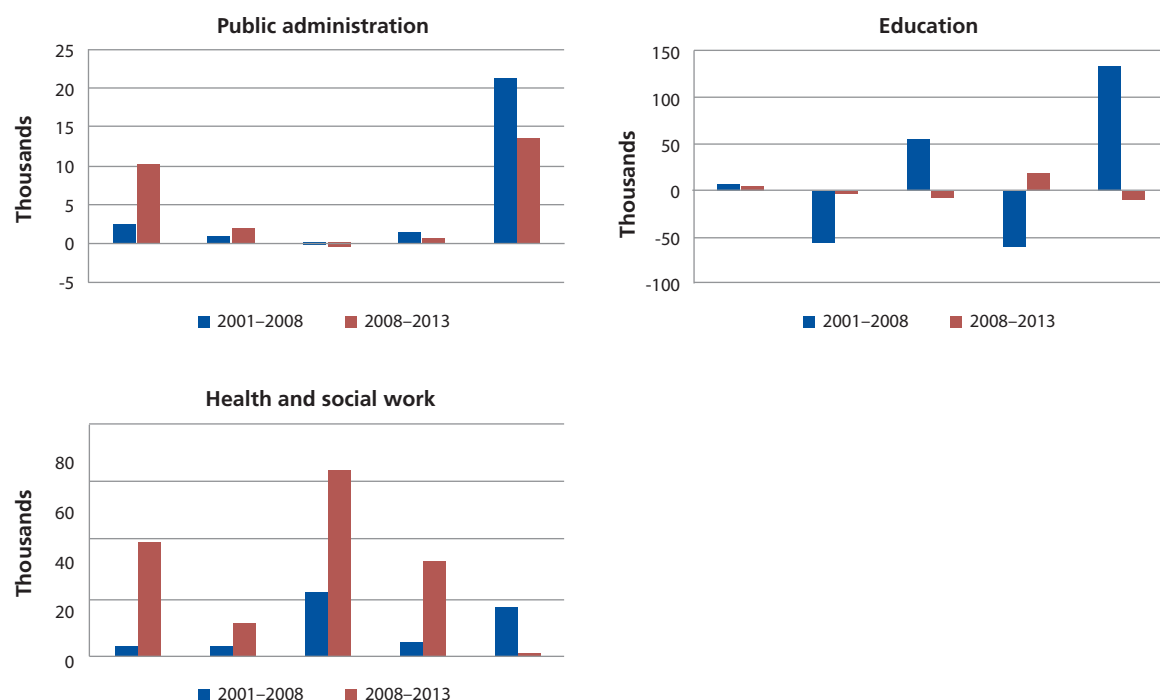
Self-employment contracted from 28.3% of total employment in 1998 to 22.5% in 2013, and much of this contraction is related to the decline of employment in the ‘shrinking small and pre-modern sector’, notably agriculture (Hwang, 2014). Nearly all of this decline occurred in jobs in the bottom two quintiles and so was intrinsically upgrading. Another contributor to the standardisation of the employment relationship in the South Korean labour market has been the declining share of non-paid family workers (from 10% to 5% of total employment over 1998–2013).

While the main pattern of employment change identified in the South Korean analysis was of upgrading, excluding self-employment leads to a quite different characterisation of more recent (2008–2013) employment growth. Instead of upgrading, growth is quite evenly distributed across the quintiles, with a modest bump upwards in the middle. This contrasts with developments in 2001–2008, which are unambiguously upgrading, whether the scope includes or excludes the self-employed.

The gender employment gap remains larger than that in many other developed countries (58% of workers are men and 42% women) and has diminished only marginally over the period covered in the analysis. Women have, however, accounted for similar absolute employment growth in the top quintile since 2001, as well as greater growth in the middle of the wage distribution. Overall, the relative contributions to overall upgrading are of a similar order for both men and women.

One of the main developments since 2001 has been the large expansion of primarily state-funded sectors as well as the more general growth of knowledge-intensive services (Figure 33). A large expansion of state welfare provision increased employment in education in 2001–2008 (especially in top-quintile jobs) and in the health and social work sectors after 2008 (mainly in the middle and bottom quintiles).

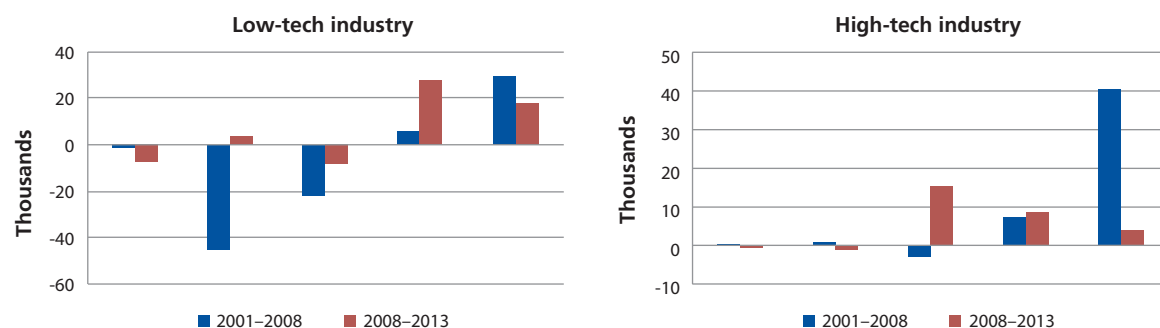
**Figure 33: Employment shifts by job-wage quintile (absolute per annum) in public services, South Korea, 2001–2013**



Source: South Korea national report

South Korea is, of course, also a major exporting country. It has a highly developed and competitive manufacturing base and an increasing trade surplus concentrated in high-tech manufactured products. It has maintained this status, with a manufacturing employment share comparable to that of the EU (16.7% of total employment in 2013) and is contracting at comparable rates (0.25 percentage points annually between 2001 and 2013 after much sharper annual falls of 0.8 percentage points in the preceding decade 1991–2001).

**Figure 34: Employment shifts by job-wage quintile (absolute per annum) in manufacturing, South Korea, 2001–2013**



Sources: South Korea national report

Employment shifts within manufacturing have been clearly upgrading, especially during 2001–2008, when the key feature was employment growth in the top quintile in low-technology-intensive

and, especially, high-technology-intensive industries (Figure 34). Employment destruction in manufacturing has been largely confined to the mid-paid and mid-low-paid quintiles in low-tech industry. Unlike the Russian example, therefore, the employment data from South Korea point to an upgrading industrial infrastructure oriented towards higher-skilled employment.

### Japan

As in South Korea, interest in changing employment structures and the debate over employment polarisation and upgrading takes place in a context of heightened public awareness of inequality. This traditionally egalitarian society has experienced growing inequality, coinciding with a period of economic stagnation (the 'lost decades' of the 1990s and 2000s). Over the same period, the labour market has been subject to deregulation, with most employment growth occurring among non-standard workers. The literature on growing inequality in Japan identifies opposing vectors of labour market influence. Rapidly increased female participation and broad upskilling, reflected in the doubling of university enrolment between 1980 and 2010 (to over 50% in 2010), have both had equalising impacts in terms of wage dispersion. Skill-biased technological change and labour market segmentation have tended to widen disparities.

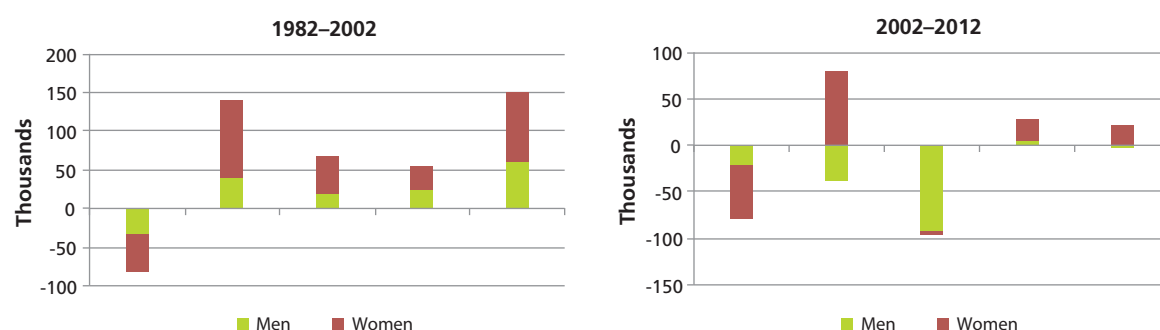
The Japanese analysis covers an extended time frame and includes separate period coverage for 1982–2002 and 2002–2012. Employment grew in the first period (by around 0.6% per annum) but contracted in the second period (by 0.15% per annum). These declines were partly the consequence of the global financial crisis, whose impacts on the Japanese labour market were relatively greater than on those of the other big Asian economies.<sup>19</sup> Slowing demographic growth also played a role; the growth of the working age population began slowing around 1990 and turned negative in 2011.

In both periods covered, the distribution of employment shifts across the quintiles is broadly similar – a pattern of polarisation across the top four quintiles with job losses in the bottom quintile. This overall pattern of (qualified) polarisation was similar for men and women, although net employment growth benefited women more than men in both periods (Figure 35). In well-paid jobs, particularly, employment growth for women outstripped that for men in both periods, a pattern also observed in many EU Member States as well as at aggregate EU level (Eurofound 2008, 2011, 2014).

From 2002 to 2012, male employment in mid-paid jobs declined sharply, while female employment growth in the same quintiles (2 and 3) was modestly positive. This led to an accentuation of the polarisation of male employment during the most recent period. The reason for this strong differentiation by gender was, again, the one familiar from recent EU analysis: sharp job losses in construction and manufacturing, predominantly male-employing sectors.

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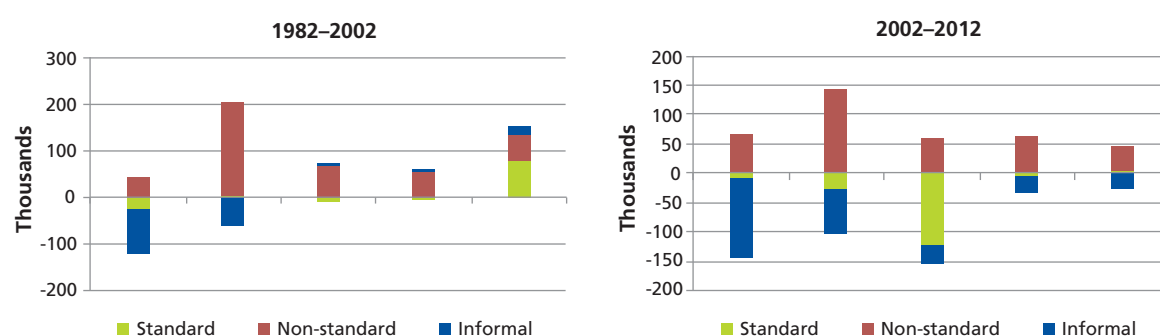
<sup>19</sup> The Japanese labour market has, nonetheless, maintained comparatively very low levels of unemployment, notwithstanding the 'lost decades'; the peak rate after the global financial crisis was 5.6%.

**Figure 35: Employment shifts by job-wage quintile and gender, Japan, 1982–2012**

Source: Kambayashi, 2014, based on author's calculation from ESS 1982, 2002, 2012

A significant process of destandardisation of employment has occurred in Japan in the period covered by the analysis, one that is quite distinctive compared with similar developments in many European countries. Traditionally characterised by strong internal labour markets, long tenure and job stability, the Japanese labour market has seen a large growth in non-standard employment since the 1980s (Duell et al, 2010).

Significantly, the most important determinant of whether a worker is in the 'core' or 'periphery' in the workplace in Japan is not contractual (open-ended or fixed-term) or based on working time (part time or full time) but whether job titles are standard (*Seishain*) or non-standard (*Hi-Seishain*) (Kambayashi and Kato, 2013). *Hi-Seishain* workers tend to work shorter hours, earn much lower hourly wages than their standard counterparts, have less security of employment, and are much less likely to be covered by work-related health, social and unemployment insurance (Duell et al, 2010).

**Figure 36: Employment shifts by job-wage quintile and employment status, Japan, 1982–2012**

Source: Kambayashi, 2014, based on author's calculation from ESS 1982, 2002, 2012

Nearly all net employment growth in the period 1982–2012 was accounted for by non-standard workers (Figure 36). This partly reflects greater female participation, as the majority of *Hi-Seishain* are women. The category of informal workers includes those that do not have labour contracts, such as executives, self-employed and family workers and employment in this category declined, especially in the lower quintiles. Employment based on the traditional 'standard' employment relationship grew only in well-paid top-quintile jobs and then only in the period up to 2002. Afterwards, there was stagnation at either end of the wage distribution for standard jobs and sharp losses in mid-paid jobs.

Overall, the transformation of the Japanese labour market has seen growing non-standard employment offset declining family work and self-employment and, to a lesser extent, declining standard employment. The increase in non-standard employment has occurred across the wage distribution (albeit with a concentration in mid-low-paid jobs) and accounts, for example, for a majority of net new employment in the top two quintiles as well as those lower down the wage distribution. As such, it is not clear that this growth of non-standard employment has contributed to polarisation. The process of labour market segmentation appears, nonetheless, to have been pervasive and also to have accelerated after 2002.

### Australia

The Australian economy was relatively unaffected by the global financial crisis and has ‘experienced over two decades of uninterrupted economic growth’ (Wright et al, 2015). In this regard, it resembles its Asian counterparts. In addition to regional proximity, the specific buffer in Australia’s case was a resource boom fuelled in particular by demand from China.

Other institutional developments important for understanding recent shifts in the Australian employment structure include the opening of the economy and the lowering of tariff barriers in the mid-1980s. This was accompanied by a phase of privatisation, financial deregulation and tax reform initiated by a reformist Labour government. Thereafter, significant deregulation of the labour market took place in the 1990s, with the pace of change accelerating from the mid-2000s. This phase of deregulation included flexibilisation of national wage-setting mechanisms, decentralisation of collective bargaining and the dilution of some employment protection provisions.

One important consequence of the more recent resource boom has been the appreciation of the Australian dollar, which has implications for manufacturing sectors reliant on export markets.

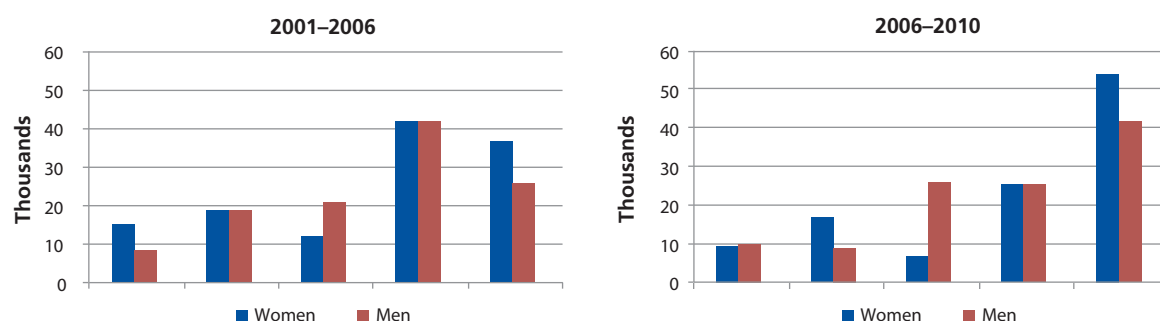
The Australian analysis covers the decade 2001–2010 in two separate periods (2001–2006 and 2006–2010). Both periods saw significant employment growth, although growth slowed marginally in the second period (Figure 37). Throughout the decade, employment shifts were clearly upgrading, with the greatest employment growth in the top two quintiles. The upgrading pattern was even more pronounced in the most recent period, with 43% of net employment growth in high-paid, top-quintile jobs.<sup>20</sup>

Over the entire period, employment growth has been more or less equally spread in absolute terms between men and women, with a consequent modest narrowing of the gender employment gap. The female share of employment grew from 47.7% in 2001 to 48.4% in 2010. Similar developments occurred in most developed countries arising from increased female labour market participation.

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<sup>20</sup> Note that the Australian analysis is restricted to employees only (excluding self-employment) and may therefore tend to exaggerate upgrading.

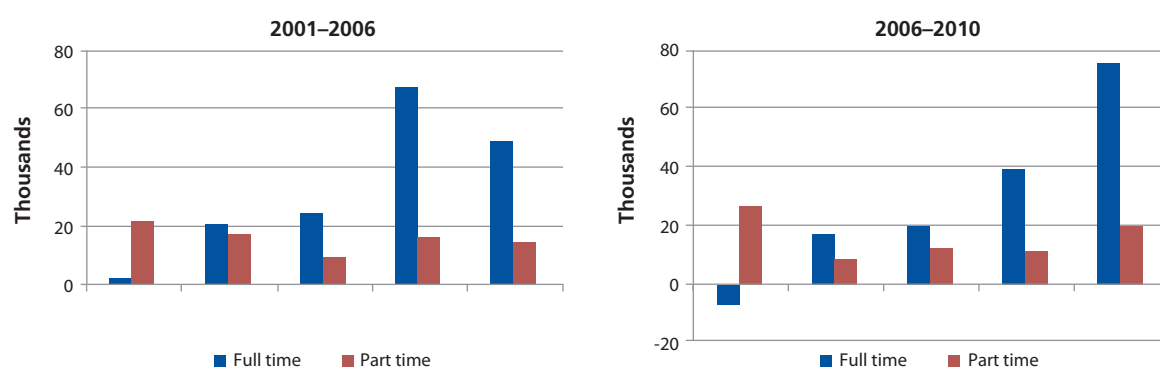
**Figure 37: Employment shifts (annual average) by job-wage quintile and gender, Australia, 2001–2010**



Source: Australia national report – Wright et al, 2015

How these employment gains were differentially distributed across the wage quintiles in Australia also echoes patterns observed in the EU in recent data (Eurofound, 2014) as well as in Japan (see Figure 35). Women accounted for most employment gains in the top-paid jobs in both periods (56%–59%) but also in lower-paid jobs. Men, meanwhile, accounted for over two-thirds of employment growth in mid-paid jobs. The jobs that contributed most to employment growth (in 2006–2010) offer a partial explanation. The three jobs that grew most were health professionals and education professionals in their respective sectors (predominantly female, well-paid jobs) and carers in the health sector (again predominantly female but low-paid). The other job with the biggest employment gain was that of construction workers (almost exclusively mid-paid, male workers).

**Figure 38: Employment shifts (annual average) by job-wage quintile for full-time and part-time employment, Australia, 2001–2010**



Source: Australia national report – Wright et al, 2015

Australia has a significant and growing share of part-time workers. Three in every 10 employees work part time, and part-time work accounted for around one in three net new jobs during the decade to 2010. While part-time work grew in every quintile in both sub-periods covered, growth was highest in low-paid, bottom-quintile jobs where almost all employment growth was part time (Figure 38). In well-paid jobs (in the top two quintiles), the share of part time in net employment growth was in the range 20%–23% in both periods – substantial, but below the general part-time share of employment. Another proxy of atypical employment status – the extent of paid leave entitlements, which is not legally mandated for casual workers in Australia – reinforces the impression of a growing share of casual or non-standard employment in low-paid jobs. Over three-quarters (77%) of net new



employment in the bottom quintile was without paid leave entitlements in 2006–2010, compared with 10% in top-quintile jobs. As the authors conclude, ‘the worst jobs (those in quintile 1) are increasingly precarious’ as well as being increasingly part time.

## Conclusions

Two broad groups of countries emerged from the job-based analysis of recent employment data covering the six non-EU countries and the EU. The first group comprises the EU, Japan and the US, which have mature, developed economies and high GDP per head; in these, a pattern of ‘asymmetrically polarised’ employment growth was observed similar to that in the original US analysis covering the 1990s (Wright and Dwyer, 2003). This was upwardly skewed across the wage distribution, and the key features were faster growth in well-paid jobs, lower but still above-average growth in low-paid jobs and weaker growth in a ‘shrinking middle’. Downturns accentuated the pace of contraction of mid-paid employment. In the second group of developed and post-transition countries with higher levels of output growth in the periods covered (Australia, China, Russia and South Korea), employment shifts were more clearly upgrading. A suggestive inference is that of an association between higher rates of output growth and employment upgrading and between lower rates of economic growth and polarisation. The relationship holds for developments across the business cycle in individual countries – for example, the sharp employment polarisation observed in the EU and the US during their respective slumps in the global recession (2007/2008–2010) – as well as between countries. The presence of many factors depressing growth rates below long-term trend rates in the mature, developed economies (high levels of public and private debt, weakening public and private investment levels, population ageing and other factors loosely grouped under the term ‘secular stagnation’) are more likely to contribute to polarising and downgrading than upgrading employment shifts. Even among the upgrading group of countries, to the extent that predictions were made by the national report authors, they were that employment shifts would be less favourable in terms of aggregate employment quality in the future. Russia, for example, will have to deal with significant demographic headwinds reversing the increased supply of workers of working age in recent decades and limiting the pace of skills improvement that contributed to recent upgrading. China, too, will face similar demographic issues arising from its one-child policy and related challenges due to the eroding labour reserve of rural workers.

The observation that well-paid employment grows fastest in periods of high growth and mid-paid employment declines fastest during downturns often has simple explanations in terms of the long-term shifts in the sectoral composition of employment.

One of the key drivers of employment destruction is the rate of deindustrialisation. This affects predominantly mid-paid manufacturing jobs and its impacts in terms of ‘shrinking the middle’ are strongest in the mature, richer, developed countries, with a notable sharpening during economic downturns. In the upgrading group of countries, manufacturing employment is either comparatively resilient (South Korea) or its losses are compensated by growth in other similarly paid jobs (for example, in construction in Australia and in the public sector in Russia). The counterpart of advanced economy deindustrialisation is the rapid rise of Chinese manufacturing and its contribution to employment growth in that country. These are linked phenomena, the consequences of greater global market integration, large labour cost differentials and the high tradability of manufacturing sector outputs.



An important (negative) contributor to employment upgrading is the rate of decline of agricultural employment. Rapid displacement of agricultural employment results in the destruction of mainly lower-quintile employment – generally accompanied by the creation of better-paid employment in other, growing sectors. This process has been particularly dramatic in China, but sharp falls in agricultural employment continued to be observed in Japan, Russia and South Korea right up to the first periods covered in the analysis and subsiding thereafter. In a European context, this phenomenon is of little relevance in most developed western European countries, where agriculture accounts for a more stable and much lower share of total employment (for example, 1% in the UK and 2% in Germany), but it is still a very important dimension of structural employment change in more recently acceding Member States, notably Poland and Romania.

In all countries covered – with China only a partial exception – service sectors have been responsible for more net new employment than that destroyed in the declining sectors. Strong private services employment growth was mainly in less knowledge-intensive services in China and Russia and in knowledge-intensive services in developed countries and the EU. In the former countries, a distinguishing feature was growing employment in retail sectors, still in a phase of rapid catch-up growth after relatively recent transitions to a market-based economy. Growth (or lack of it) in public services employment (including health and education) tended to be quite period-specific, for example in Australia, Japan and South Korea, indicative of the direct influence of the prevailing government on employment levels in predominantly publicly funded sectors.

Gender employment gaps were closing across the countries covered. There was some corroboration of recent findings from jobs-based analysis of the EU (Eurofound, 2014) and US (Wright and Dwyer, 2003) that women were accounting for the majority of employment growth in well-paid jobs. This was observed also in Australia and Japan in both periods covered. Occupational change has tended to favour women, to the extent that employment in many well-paid, predominantly female jobs, often in the public services (such as educators and medical professionals), has been expanding, while predominantly male-employing jobs have been in decline.

Now to revisit some of the questions posed at the outset, which it was hoped this broader international, comparative application of the jobs-based approach might help to elucidate. Of course, a large caveat is that all answers are based on a very limited sample and, therefore, should be taken as tentative and provisional; but they are possible directions for future research and testing.

- **Have the employment shifts observed been favourable in terms of aggregate employment quality?**

In all countries and periods featured, the main patterns varied between clear upgrading (in Russia) and clear polarisation (in the EU and USA during 2007/2008–2010), with some hybrid polarising and upgrading (in Japan). Upgrading patterns were more common than polarisation. No downgrading employment shifts were identified though it is important nonetheless to take note of some recent suggestive evidence of downgrading from the US (Autor, 2010) in the period 1999–2007 and from some EU Member States during the post-crisis period.

- **Do different stages of economic development and rates of growth have an impact on the qualitative shifts of employment observed?**

Both appear to be important. The stage of economic development affects the composition of employment and its rate of reallocation between primary, secondary and tertiary sectors. A quite

distinctive pattern of employment growth can be seen; for example, in China, the main employment reallocation is from agriculture to manufacturing and services, whereas in all of the other countries, reallocation is more from agriculture and manufacturing to services.

As already described, the rate of economic growth also appears to affect the extent to which developed countries exhibit employment shift patterns on the spectrum from polarisation to upgrading. Periods of faster economic growth are more likely to involve clear upgrading of the employment structure. The reason for this is partly that a higher share of better paid and more productive jobs is both cause and effect of greater economic growth.

- **Is the hypothesis of skill-biased technological change applicable mainly to post-industrial economies where the ‘service transition’ is in a mature phase?**

This is not easy to answer. Work in less knowledge-intensive service sectors such as retail, or in construction or manufacturing, the main growth sectors in China, may require different skills, but to what extent these are higher-level skills than those deployed in the declining agricultural sector is unclear. Given the similarities between developments in China in the last generation and those in the first industrial revolutions, it is worth recalling that technical change was largely ‘skill-replacing’ rather than ‘skill-biased’ in the transition from artisanal to factory production (Acemoglu, 2002). The Russian case also cast some doubt over an explanation of observed employment shifts based on skill-biased technological change. Here, there was significant employment growth that was clearly upgrading, but it occurred in a context of a deteriorating industrial infrastructure, with only a marginal contribution of high-tech or knowledge-intensive sectors to overall employment growth. Skill-biased organisational change was considered a more plausible explanation of the changes observed and related to specific historical circumstances, such as recent marketisation after the abandonment of Soviet-era central planning. Nonetheless, the predominant pattern observed across the countries – employment upgrading, in some cases linear and monotonic – was that predicted by skill-biased technological change.

- **What does the descriptive analysis indicate about the changing global division of labour?**

It largely corroborates what is known from other sources about the shift of manufacturing activity and employment from developed, mature economies to China and other lower-labour-cost destinations. The shrinking middle in high-GDP countries is largely attributable to declines in mid-paid manufacturing employment and has its counterpart in the Chinese growing middle, boosted in particular by that country’s emergence as a manufacturing power. This shift, of course, relates just to the most globalised of sectors in terms of tradability, manufacturing. Global value chains are much less developed in services, and shifts in services employment are more likely to be affected by local or national circumstances.

- **Can any links be identified between specific institutional labour market features and specific patterns of employment shift?**

Institutional labour market developments were identified as an important contextual feature of employment shifts in a number of the country-specific analyses. In the main, these involved destandardisation of the employment relationship – for example, the increase in ‘non-standard’ work titles in Japan, and the large and growing share of part-time employment in Australia, similar to the EU. The destandardisation of the employment relationship in Japan has been particularly pervasive, with non-standard workers accounting for the vast majority of net new employment in both periods and indications that this process has accelerated. This has occurred across the wage distribution.

Similar to the conclusions based on recent EU data, standard employment in Japan has tended to grow only in jobs in the top quintile. Standard, traditional or core-worker status appears increasingly to be the privilege of those in better-paid jobs.

Finally, the Global Jobs Project also provides suggestive evidence of other factors influencing changes in the employment structure. The principal broad factors identified to date are technology and technical change, trade and globalisation, and labour market institutional effects. All are likely to have played an important role in shifting demand for specific categories of work and worker. The view that technology – and specifically ‘routine-biased technical change’ – is the key factor has become something of an orthodoxy, notably among labour economists (Autor, 2006; Goos et al, 2009), but has also been increasingly contested (Mishel et al, 2013; Oesch, 2013; Eurofound, 2014). The field of potentially significant factors has broadened to give greater place, for example, to factors on the labour market supply side. Employers make their decisions to hire not just based on product or service demand but on the availability of suitably skilled workers. For this reason, factors such as educational upskilling (Oesch, 2013), increased labour market participation of women (Dwyer, 2013) and levels of migrant labour (Wright and Dwyer, 2003; Muñoz de Bustillo and Antón, 2012) have entered the debate. Growing inequality may also have a role in the changing distribution of employment across occupations, notably via consumption spillover effects (Mazzolari and Ragusa, 2007).

Some of the national contributions (from Australia, Russia and South Korea) serve as a reminder of the role of the state as a job creator: governments do create jobs. The level of public service employment varies markedly from country to country in line with historical path dependencies and contemporary political – and electoral – choices. To the extent that state-funded employment is more likely to be higher-skilled and higher-paid, these variations will affect aggregate employment quality.

It has also been seen how a host of historical, macroeconomic and business-cycle factors influence shifts in the employment structure in the countries covered. Sufficient attention is not always paid to these. In the EU, there was a clear sharpening of employment polarisation in the recession that followed the global financial crisis in 2008 and, more generally, polarisation was associated with periods of slowing output growth.

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# Annex 1: Construction of the job rankings

This annex provides details about the process of constructing the job-wage, job-education and job-quality rankings used in this report.

The jobs-based approach that underlies the EJM is based on studying change in employment across occupations and sectors from the perspective of some specific job-quality ordinal index. The process is as follows:

1. overall employment is split into jobs (occupations within sectors at the two-digit level of ISCO and NACE, respectively);
2. those jobs are ranked and grouped according to some job-quality indicator;
3. the change in employment numbers across jobs is plotted against their quality.

In the original Jobs project (Eurofound, 2008; Fernández-Macías et al, 2012), two fixed rankings were used for analysing structural change in employment in 23 European countries between 1995 and 2007. One of those rankings was based on the average educational level of workers within each job, drawing from EU-LFS data. The other ranking was based on the average hourly pay of workers within each job and was constructed from different statistical sources combined at the job level.<sup>21</sup> Those two rankings provided a sound basis for analysing structural change in employment between 1995 and 2007 across the EU.

From 2008, the classification of sectors in the EU-LFS moved to Revision 2.0 of the NACE international standard, and from 2011, the classification of occupations in the EU-LFS moved to the 08 version of the ISCO international standard. In both cases, the revisions were so substantial that there is no compatibility between the old and the new classification systems at any level of aggregation; hence the discontinuity is unavoidable.

## Construction of the educational ranking

This ranking is the simplest because the EU-LFS includes all the necessary information to construct it. The basis for this ranking is the variable International Standard Classification of Education (ISCED) included in the EU-LFS datasets. ISCED is an internationally comparable codification of national educational systems, which was originally designed by UNESCO in the 1970s and updated several times. A highly aggregated version of ISCED was used, which distinguishes three broad levels of education:

- low (basic schooling or less, below ISCED 2);
- medium (upper secondary and post-secondary pre-tertiary, ISCED 3–4);
- high (tertiary, ISCED 5 and above).

For each country, the average educational level of all workers within each job was calculated, assigning an arbitrary value of 0 to low, 0.5 to medium and 1 to high educational level. These values

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<sup>21</sup> The underlying structure of this ranking was provided by the 2002 European Union Structure of Earnings Survey (SES). To cover for jobs not included in the SES sample, it was necessary to complement it with data from the European Community Household Panel (ECHP) survey and the European Union Survey on Income and Living Conditions (EU-SILC), as well as with data from national accounts to provide more detailed data on wages in the manufacturing sector (see Eurofound, 2008b for more details).

were used to generate the educational ranking.<sup>22</sup> For the period 2011 Q2 to 2014 Q2, these average values are based on the pooled data for 2011 Q1–2014 Q2 (with German data omitted for 2011 for reasons identified in Annex 2).

## Construction of the wage ranking

As in previous analyses of the EJM data, the construction of the wage ranking is more complicated (Eurofound, 2008b, 2011). The main reason is that the EU-LFS does not include a variable that measures wages as a continuous quantity that can be divided by the number of hours worked in order to get an indicator of hourly labour compensation. Up to 2009, there was no mandatory collection of wage data at all, which forced previous analyses of the EJM to use external data for this purpose (Eurofound, 2008b) – or to rely on voluntarily submitted wage data, which covered less than half of the Member States and was of variable quality.

From 2009, the EU-LFS includes a variable that positions each worker in the distribution of wages of their country within a decile scale. This variable causes two problems for the purposes of this analysis: first, it provides only a very crude approximation to the actual distribution of wages in each country, providing just 10 possible values instead of the full complexity of a continuous variable; second, it allows only the identification of the relative position of each worker within a 10-point scale, without the monetary values that correspond to each position in such scale. Because of the latter problem, it is impossible to calculate even an approximate value for hourly wage.

Unfortunately, there is no EU-wide data source that allows the calculation of a reliable estimate of average hourly wages at the job level. The closest match is the European Union Structure of Earnings Survey (SES), last carried out in 2010, which includes a continuous variable of wages and another on working hours and allows for classification of workers by sector (NACE Rev. 2.0) and occupation (ISCO-08). However, this source does not cover the full economy, leaving out the public sector and agriculture, as well as all companies with fewer than 10 employees.

In the end, a job-wage ranking was used based on a combination of the SES 2010 data and the income decile data from the 2011 EU-LFS. The SES data were used to calculate average hourly wages per job within each country and to generate a nationally specific ranking with it (with interpolation of a weighted EU average ranking in order to fill the gaps in national rankings). The EU-LFS data were used to calculate an average income decile position for full-time workers within jobs in which at least 50% of occupants work full time, applying the same EU average interpolation. Finally, the two normalised rankings were averaged and re-normalised. The reason for using two different sources is that no single source is adequate for the purposes of analysing the employment structure. A simple average at the job level of two different normalised job quality rankings (each of them incomplete on its own) should provide a more reliable indicator that can be used to rank the jobs and study their evolution over time.

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<sup>22</sup> Because the basis for the ranking is the average of just three values (0, 0.5 and 1), there are some jobs that have exactly the same value (for instance, professional jobs occupied only by workers with third-level education) and that cannot therefore be unambiguously ordered. Because of this, the authors constructed an EU-level average of the national averages that was used as a secondary ranking variable (so if two jobs had the same value at the national level, they were sorted according to their EU-level average, which is much less likely to be identical because it is based in a much larger sample).



### **Construction of the non-pecuniary job quality ranking**

The third job-ranking criterion is a multidimensional indicator covering four major dimensions of job quality identified in the job quality literature – intrinsic job quality; employment quality; workplace risks; and working time and work–life balance. The indicator is non-pecuniary in that it does not include any component based on wage or work income. This omission is deliberate in order to avoid overlap with the primary job-wage ranking. The indicator is based on combining data from over 40 questions from the 2010 European Working Conditions Survey (EWCS). Individual jobs are then ranked based on their average score across the included variables. For a full account of the construction of the job-quality ranking, see Eurofound, 2013, Chapter 3.

Both the educational and wage rankings are generated at Member State and aggregate EU level. The non-pecuniary job-quality ranking is a common EU-based ranking due to the limited sample size of the EWCS at Member State level.

## Annex 2: Handling of data breaks

**Table A1: How major classification or data breaks were dealt with**

Country	Nature of break	Year and quarter	Impact	Solution
France	ISCO occupational classification break	2013 Q1	Some reassignment of employment across ISCO categories. Obvious mainly at two-digit level.	Aggregate ISCO two digit to one digit for ISCO two-digit categories 10–54.
Germany	ISCO occupational classification break	2012 Q1	Significant reassignment of employment across ISCO categories, at one-digit and two-digit level of detail.	Use 2012 Q2–2014 Q2 data for all German charts, omitting the first year.
Netherlands	ISCO occupational classification break	2013 Q1	Some reassignment of employment across ISCO categories. Obvious mainly at two-digit level.	Aggregate ISCO two digit to one digit for the Manager and Professional categories (ISCO 12–14) and the clerical category (ISCO 40–44) for the entire period.  Note: This simple fix could not be implemented for, and does not address, possible reassignment of associate professionals to professional status in same quarter. As a result, charts for the Netherlands may exaggerate upgrading and should be read with caution.
Romania	Major revision downwards of employment estimates due to census revision of population estimates (-7%).	2014 Q1	Eliminates circa 600,000 Romanian jobs and raises the estimate of employment growth in Romania and the EU in 2011 Q2–2014 Q2.	Rescale employment from 2011 Q2 to 2013 Q2 downwards for all jobs to reflect the census-based revision.

Other breaks are identified by Eurostat for other Member States in different quarters, for the core variables (ISCO and NACE) as well as for employment estimates. However, adjustments were only made in the above cases as they involved obviously artificial and large shifts in employment share by occupation.

For the EU28 aggregate figures for 2011 Q2, the missing year of German data is accounted for by backcasting the German data from 2012 Q2 to 2011 Q2 using the aggregate employment shift observed – in other words, preserving the structure of employment observed in 2012 Q2. For the EU28 aggregates in the breakdown charts (for example, gender and full-time and part-time employment), the missing year of German data again relies on backcasting of the 2012 Q2 data to 2011 Q2, preserving the ISCO and NACE structure of employment observed in 2012 Q2 but with the additional modification of factoring in the observed German changes in employment for 2011 Q2–2012 Q2 for the categories of the breakdown variable(s).

# Annex 3: Aggregate employment shifts in Member States

**Table A2: Employment shifts (in thousands) by country according to wage quintile, 2011 Q2–2014 Q2**

2011 total employment	4,141	4,544	2,946	402	4,877	39,958	2,713	597	4,124	18,622	2,517	25,845	1,480	3,809	1,861
	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	HR	IE
Quintile 1	-7	-6	14	-2	-13	183	2	11	-47	-97	-17	0	95	-15	15
Quintile 2	-23	-98	-23	-7	17	195	-21	-6	-129	-403	16	107	63	-27	25
Quintile 3	-19	-36	-23	-16	-1	195	-34	1	-202	-397	-18	314	85	17	-2
Quintile 4	17	-4	44	-14	-18	6	21	7	-152	-262	13	-415	45	37	-13
Quintile 5	113	145	21	1	101	44	22	14	-55	-108	-23	-14	25	75	16
Total employment gain/loss	81	1	33	-37	86	623	-10	27	-585	-1267	-28	-9	312	88	40

2011 total employment	23,094	1,262	222	859	166	8,345	15,578	4,799	8,572	4,645	938	2,319	29,063	217,992
	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU
Quintile 1	307	17	-4	-20	5	-4	-48	-112	54	19	11	71	367	333
Quintile 2	-312	0	0	20	-3	-14	-295	-115	9	-36	5	35	181	-336
Quintile 3	-153	10	8	27	3	-54	73	-138	19	0	-11	-2	133	-536
Quintile 4	-341	19	13	-7	6	-95	98	10	79	78	-19	-38	274	-377
Quintile 5	-147	2	8	11	-1	85	387	71	-59	73	5	-33	439	1,550
Total employment gain/loss	-646	48	24	31	11	-82	214	-285	102	133	-8	34	1,394	633

Note: 2012 Q2–2014 Q2 data for Germany. See Annex 2 for other data adjustments.

**Table A3: Employment shifts (in thousands) by country according to wage quintile, 2013 Q2–2014 Q2**

2013 total employment	4,172	4,549	2,940	365	4,953	40,485	2,698	632	3,535	17,161	2,506	25,810	1,542	3,931	1,870
	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	HR	IE
Quintile 1	46	-27	-4	4	-22	117	22	-5	26	22	-7	93	39	3	6
Quintile 2	-13	-72	-9	0	14	8	5	-5	31	35	-1	30	49	-23	19
Quintile 3	-17	-19	10	1	27	61	-8	6	15	90	4	262	53	8	6
Quintile 4	-14	23	14	-8	5	-67	-12	-2	-46	66	0	-290	37	0	-1
Quintile 5	48	91	29	3	-15	-22	-2	-2	-23	-20	-13	-60	12	36	1
Total employment gain/loss	50	-4	39	0	9	97	6	-8	4	192	-17	36	190	24	32

2013 total employment	22,460	1,297	238	889	175	8,369	15,528	4,425	8,698	4,716	904	2,328	29,639	216,813
	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU
Quintile 1	-6	16	-6	-2	1	2	38	-64	2	2	23	17	274	539
Quintile 2	-58	-2	1	6	1	-29	-98	-45	-43	-5	1	3	188	341
Quintile 3	113	10	4	-3	2	10	131	34	-4	5	5	-16	143	505
Quintile 4	-34	-14	8	0	-1	-63	45	67	46	26	-13	-8	54	-64
Quintile 5	-28	3	0	0	0	14	147	97	-24	34	10	30	165	562
Total employment gain/loss	-13	12	8	0	2	-67	264	90	-23	62	27	26	825	1,883

# Annex 4: Categorisation of the service sector

**Table A4: Knowledge-based services aggregation – breakdown by NACE Rev. 2 two-digit sector**

Private knowledge-intensive services	<p>50 to 51 Water transport, Air transport</p> <p>58 Publishing activities</p> <p>59 to 63 Motion picture, video and television programme production, sound recording and music publishing activities; Programming and broadcasting activities; Telecommunications; Computer programming, consultancy and related activities; Information service activities</p> <p>64 to 66 Financial and insurance activities (section k)</p> <p>69 to 71 Legal and accounting activities; Activities of head offices, management consultancy activities; Architectural and engineering activities, technical testing and analysis</p> <p>72 Scientific research and development</p> <p>75 Veterinary activities</p> <p>73 to 74 Advertising and market research; Other professional, scientific and technical activities</p> <p>78 Employment activities</p> <p>80 Security and investigation activities</p> <p>90 to 93 Arts, entertainment and recreation (section R)</p>
Public knowledge-intensive services	<p>84 Public administration and defence; compulsory social security (section O)</p> <p>85 Education (section P)</p> <p>86 to 88 Human health and social work activities (section Q)</p>
Less knowledge-intensive services	<p>45 to 47 Wholesale and retail trade and repair of motor vehicles and motorcycles (section G)</p> <p>49 Land transport and transport via pipelines</p> <p>52 Warehousing and support activities for transportation</p> <p>53 Postal and courier activities</p> <p>55 to 56 Accommodation and food services activities (section I)</p> <p>68 Real estate activities</p> <p>77 Rental and leasing activities</p> <p>79 Travel agency, tour operator reservation service and related activities</p> <p>81 Services to buildings and landscape activities</p> <p>82 Office administrative, office support and other business support activities</p> <p>95 Repair of computers and personal and household goods</p> <p>94 Activities of membership organisations</p> <p>96 Other personal service activities</p> <p>97 to 99 Activities of households as employers of domestic personnel; Undifferentiated goods-and services-producing activities of private households for own use (section T); Activities of extraterritorial organisations and bodies (section U)</p>

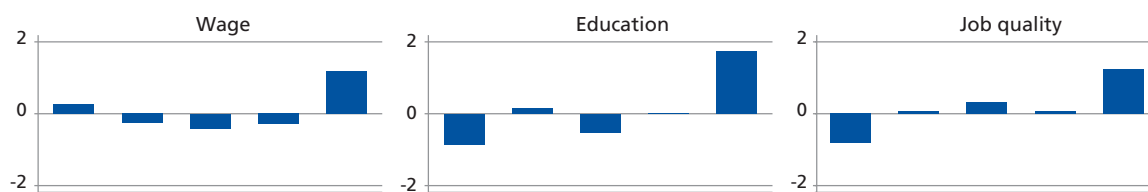
Source: Eurostat, Eurostat indicators on high-tech industry and knowledge-intensive services, available at [http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec\\_esms\\_an3.pdf](http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf)

# Annex 5: Comparing employment shifts using different job-quality measures

As noted in the 2014 EJM annual report (Eurofound, 2014, pp. 29 and 41), it is important to bear in mind that the shape of the employment shifts observed depends on the particular job-quality criterion used to rank jobs. In most of the analysis in this and related previous work (Eurofound 2008a, 2011, 2013, 2014), job-wage has been used as the primary ranking criterion. Wages are only one dimension of job quality, but they are an important one, highly correlated with other relevant aspects of job quality. The use of mean or median job (or occupation) wage as the basic ranking criterion has also been the common approach of much of the employment polarisation literature (Autor, 2010; Goos and Manning, 2007).

As Figure A1 highlights, however, using job-wage to rank jobs and assign them to quintiles tends to generate more polarised patterns of employment change (greater relative growth at the edges, less in the middle) than other ranking criteria.

**Figure A1: Annual percentage employment change by wage, education and job quality quintile, EU, 2011 Q2–2014 Q2**



Note: Q2 data in each year. Data adjusted for breaks in France, Germany, the Netherlands and Romania as indicated in Annex 2.

Source: EU-LFS, SES, EWCS (own calculations)

In Figure A1, observed employment shifts in the EU in 2011 Q2–2014 Q2 are compared using the main job-wage ranking, an education-based ranking and a non-pecuniary job-quality ranking. The education ranking is based on the average achieved educational level of job-holders (using the ISCED-based *hatlev1d* variable in the EU-LFS). The job-quality ranking is based on a multidimensional non-pecuniary job-quality indicator based on answers to 38 questions in the 2010 EWCS (see Annex 2 for notes and references regarding construction of the index).

There are some points of similarity between the three charts, reflecting the high correlation (>0.7) between the different measures of job quality used to rank jobs. The top quintile is growing regardless of the ranking criterion, and job destruction is concentrated in the lower quintiles – quintiles 2 and 3 for the wage-based ranking, quintile 1 for the education-based and job-quality-based rankings. Both in terms of education and non-pecuniary job quality, the pattern has been one of occupational upgrading in this period, with gains in the top quintile counterbalanced by declines in the bottom quintile. Only for the wage-based ranking is there a more polarised employment shift, with relative loss in the middle quintiles, although, again, the single most obvious feature of the wage-based chart is strong growth at the top (signifying upgrading).

The reason for the (modest) differences between the three measures is that a substantial proportion of jobs in the middle of the wage distribution have a *relative wage premium* (a higher relative position in terms of wages than education or non-pecuniary job-quality attributes) and that these jobs have

been responsible for a large share of overall job destruction during the crisis. As Table 1 in Chapter 1 illustrated, two of the largest-employing jobs in the EU are building and related trades workers in construction and drivers and mobile plant operators in transport. Both are in the middle quintile (3) of the wage distribution, but only the first or second quintile in terms of education or broader job quality. These archetypal blue collar, male jobs have both shed employment throughout 2008–2014 and contribute to explaining the differences between the three charts.

So anxieties about the ‘shrinking middle’ relate mainly to employment shifts when categorised using one measure of job quality – wages. Other important measures tend to show shifts in a more upgrading light, consistent with the predictions of skill-biased technological change. This recalls Daniel Oesch’s conclusion following a jobs-based analysis of the pre-crisis period (1990–2008) in five European countries: ‘the employment drop in the lower-middle and middle quintiles concerns comparatively well-paid working-class jobs’ (Oesch, 2013, p.57). The jobs that have been disproportionately affected by employment loss during the crisis have been mid-paid jobs that do not require high levels of formal education.

# Annex 6: List of sources for Chapter 2 analysis

**Table A5: Periods of analysis, main classifications and databases used in analysis of Spain**

Period	Occupation	Sector of activity	Source of jobs rank
1977 <sup>a</sup> –1985 <sup>a, b</sup>	CNO-79 (2 digits)	CNAE-74 (2 digits)	Basic Household Budget Survey 1990–1991 (activity at 1 digit) + Labour Force Survey 1977 (education ranking for the primary sector at 2 digits)
1985 <sup>a, b</sup> –1991 <sup>b</sup>	CNO-79 (2 digits)	CNAE-74 (2 digits)	Basic Household Budget Survey 1990–1991 (activity at 1 digit) + Labour Force Survey 1977 (education ranking for the primary sector at 2 digits)
1991 <sup>b</sup> –1992 <sup>c</sup>	CNO-79 (2 digits)	CNAE-74 (2 digits)	Basic Household Budget Survey 1990–1991 (activity at 1 digit) + Labour Force Survey 1977 (education ranking for the primary sector at 2 digits)
1992 <sup>c</sup> –1993 <sup>c</sup>	CNO-79 (2 digits)	Broad groups of sectors of activity	Basic Household Budget Survey 1990–1991 (activity at 1 digit) + Labour Force Survey 1977 (education ranking for the primary sector at 2 digits)
1994 <sup>a, c</sup> –2005 <sup>a</sup>	CNO-94 (2 digits)	CNAE-93 (2 digits)	Wage Structure Survey 2006 + Survey of Living Conditions 2006 (for the primary sector and domestic servants)
2005 <sup>a</sup> –2008 <sup>b</sup>	CNO-94 (2 digits)	CNAE-93 (2 digits)	Wage Structure Survey 2006 + Survey of Living Conditions 2006 (for the primary sector and domestic servants)
2008 <sup>b, c</sup> –2010 <sup>c</sup>	CNO-94 (2 digits)	CNAE-09 (2 digits)	Survey of Living Conditions 2009 and 2010
2010 <sup>c</sup> –2013 <sup>a</sup>	CNO-11 (2 digits)	CNAE-09 (2 digits)	Wage Structure Survey 2010 + Labour Force Survey 2010 (education ranking for the primary sector and domestic servants)

Notes:

<sup>a</sup> Year selected because it is part of a period initially proposed to be analysed;

<sup>b</sup> year selected because it is the start or the end of an economic cycle (in terms of employment);

<sup>c</sup> year selected because there is a change in a classification.

1977 is used instead of 1976 because there is the first available Q<sup>o</sup> of Spanish Labour Force Survey; 1992–1993 will be analysed using only occupation (2 digits) and broad groups of sectors of activity if possible; 1994–2008 instead of 1994–1995 and 1995–2008 is analysed in order to reduce the number of periods analysed.

**Table A6: Periods of analysis, main classifications and databases used in analysis of the UK**

Period	LFS employment data		Occupation	Industry	NES/ ASHE wage data	Data citation for wage data
1	1975	1984	Harmonised across LFS 1975, LFS 1984 and NES 1980 KOS 4-digit to produce 288 4-digit categories	Harmonised SIC 1968 (27 1-digit groups) with SIC 1980 10 1-digit groups	1980	Department of Employment, New Earnings Survey, 1980 [computer file]. Colchester, Essex: UK Data Archive [distributor], November 1987. SN: 2253, <a href="http://dx.doi.org/10.5255/UKDA-SN-2253-1">http://dx.doi.org/10.5255/UKDA-SN-2253-1</a>
2	1985	1990	Harmonised NES 1988 with LFS data; 288 4-digit categories	SIC 1980 – 10 1-digit groups	1988	Office for National Statistics, New Earnings Survey, 1986–2002: Secure Access [computer file]. Colchester, Essex: UK Data Archive [distributor], March 2011. SN: 6704
3	1991	2000	SOC 1990 – 371 4-digit categories	SIC 1992 – 17 1-digit groups	1995	As above
4	2001	2010	SOC 2000 – 353 4-digit categories	Harmonise SIC 2003 used in NES 2005 to fit with SIC 1992 (LFS 2001) and SIC 2007 (LFS 2010) – 16 1-digit groups	2005	Office for National Statistics, Annual Survey of Hours and Earnings, 1997–2013: Secure Access [computer file]. 5th Edition. Colchester, Essex: UK Data Archive [distributor], June 2014. SN: 6689, <a href="http://dx.doi.org/10.5255/UKDA-SN-6689-4">http://dx.doi.org/10.5255/UKDA-SN-6689-4</a>
5	2011	2014	SOC 2010 – 369 4-digit categories	SIC2007 – 21 industry groups	2012	As above

Notes: ASHE = Annual Survey of Hours and Earnings; LFS = Labour Force Survey; NES = New Earnings Survey; SIC = Standard Industrial Classification; SOC = Standard Occupational Classification

**Table A7: Periods of analysis, main classifications and databases used in analysis of Sweden**

Labour Force Survey			Wage data
Period	Occupation	Industry classification	
1970–1975	NYK58	SNI 69 (= ISIC Rev.2)	Population census, tax register, gross labour income
1975–1984	NYK58	SNI 69 (= ISIC Rev.2)	Population census, tax register, gross labour income
1985–1990	NYK83	SNI 69 (= ISIC Rev.2)	Population census, tax register, gross labour income
1991–1996	NYK83	SNI 92 (= NACE Rev. 1)	LOUISE, gross labour income
1997–2002	SSYK96 (ISCO-88)	SNI 92 (= NACE Rev. 1)	LISA, gross labour income
2003–2007	SSYK96 (ISCO-88)	SNI 2002 (= NACE Rev. 1.1)	LISA, gross labour income
2008–2011	SSYK96 (ISCO-88)	SNI 2007 (= NACE Rev. 2)	LISA, gross labour income

Notes: NYK = Nordic Occupational Classification; SNI = Swedish Standard Industrial Classification; SSYK = Swedish Standard Classification of Occupations;

**Table A8: Periods of analysis, main classifications and databases used in analysis of Germany**

Period	Year of ranking	Occupation	Industry classification	Database
1984–1991	1991*	ISCO-88, 3-digit	NACE Rev. 1, 1-digit	SOEP only
1992–1997	1997	ISCO-88, 3-digit	NACE Rev. 1, 1-digit	SOEP only
1998–2001	2001	ISCO-88, 3-digit	NACE Rev. 1, 1-digit	SOEP/ Mikrozensus
2002–2007	2006	ISCO-88, 3-digit	NACE Rev. 1, 1-digit	SOEP/ Mikrozensus
2008–2011	2008	ISCO-88, 3-digit	NACE Rev. 1, 1-digit	SOEP/ Mikrozensus

Notes: SOEP = German Socio-Economic Panel

\* data available only for the former Federal Republic of Germany

**Table A9: Periods of analysis, main classifications and databases used in analysis of Ireland**

Period	Occupation	Industry classification	
1971–1981	ISCO-88 1-digit	IPUMS general sectors (≈NACE 1-digit)	IPUMS for employment, Living in Ireland Survey 1994–1999 for wages
1981–1991	ISCO-88 1-digit	IPUMS general sectors (≈NACE 1-digit)	IPUMS for employment, Living in Ireland Survey 1994–1999 for wages
1991–1996	ISCO-88 1-digit	IPUMS general sectors (≈NACE 1-digit)	IPUMS for employment, Living in Ireland Survey 1994–1999 for wages
1996–2006	ISCO-88 1-digit	IPUMS general sectors (≈NACE 1-digit)	IPUMS for employment, Living in Ireland Survey 1994–1999 for wages

Notes: IPUMS = Integrated Public Microdata Series

\* Sample restricted to 22–64-year-olds



**Table A10: Periods of analysis, main classifications and databases used in analysis of Switzerland**

Period	Occupation	Industry classification	
1970–1980	ISCO-88 4-digit	6 broad sectors	Population census for employment, Swiss Labour Force Survey 1993–1998 for wages
1980–1990	ISCO-88 4-digit	6 broad sectors	Population census for employment, Swiss Labour Force Survey 1993–1998 for wages
1990–2000	ISCO-88 4-digit	6 broad sectors	Population census for employment, Swiss Labour Force Survey 1993–1998 for wages
2000–2010	ISCO-88 4-digit	6 broad sectors	Population census for employment, Swiss Labour Force Survey 1993–1998 for wages

\* Sample restricted to 22–64-year-olds

# Annex 7: Additional charts relating to employment change in six countries

Figure A2: Relative change in job-wage quintiles in six countries, 1970–2014

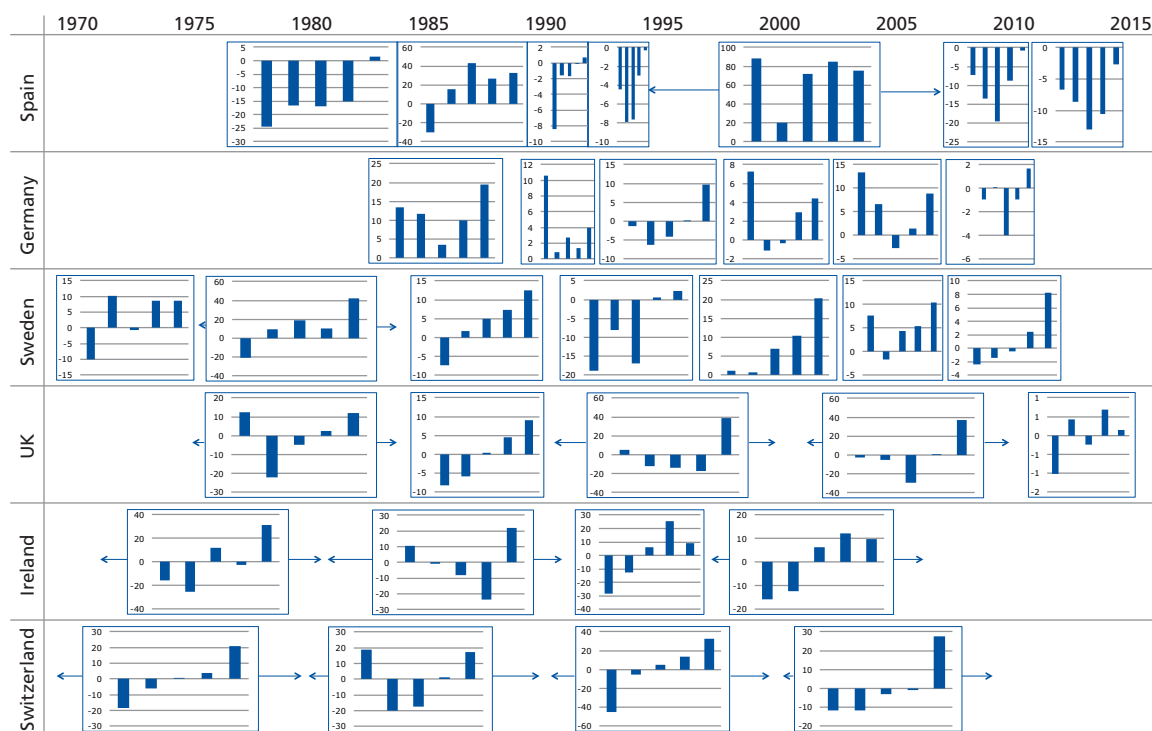
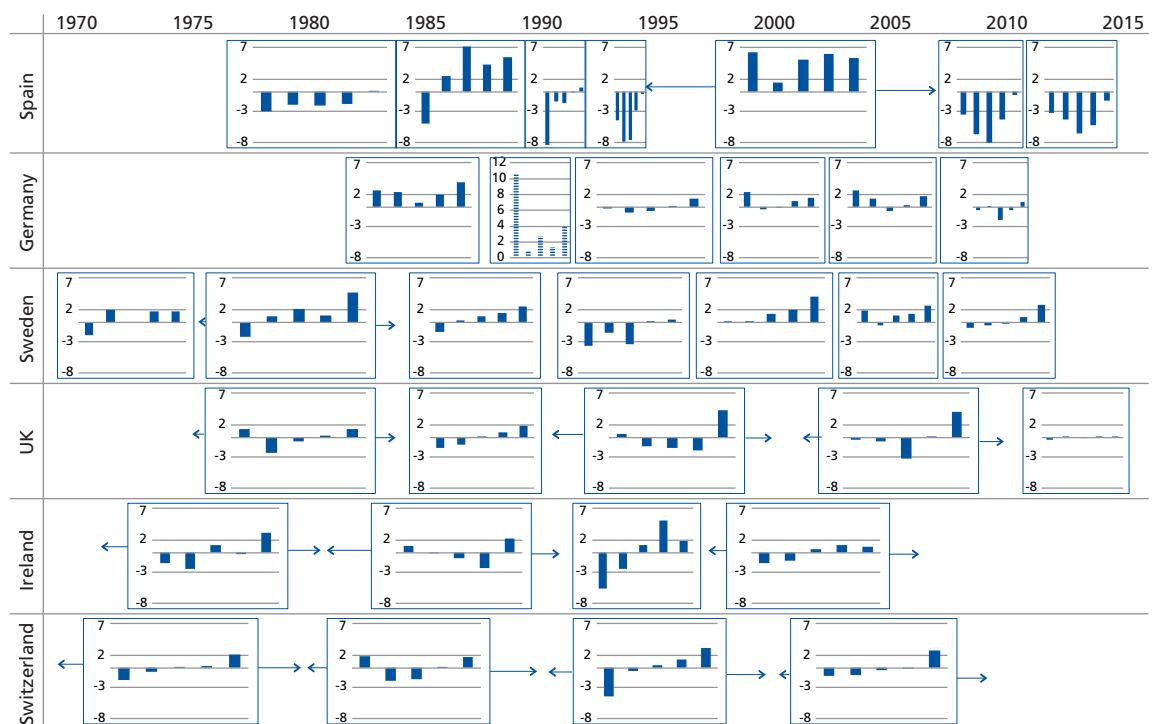


Figure A3: Relative change (annual average) in job-wage quintiles in six countries, 1970–2014



# Annex 8: The Global Jobs Project: Papers and participants

## National contributions to the Global Jobs Project

Gimpelson, V. and Kapeliushnikov, R. (2014), *Polarization or upgrading? Evolution of employment in transitional Russia*, draft report received 4 December 2014, published as discussion paper No. 8688, IZA, Bonn, available at <http://ftp.iza.org/dp8688.pdf>.

Du Yang, Qu Xiaobo and Cheng Jie (2014), *Changes in the employment structure in China: 2005-10 – Report of Global Jobs Project (China)*, draft report received 22 December 2014.

Dwyer, R. and Wright, E. O. (2015), *Preliminary results from US*, data and figures received 12 February 2015.

Hwang, Deok Soon (2014), *Changes in Korea's job quality: 2001-13*, draft report received 17 December 2014.

Kambayashi, R. (2014), *Global change in the structure of employment: A note on the Japanese case*, draft report received 24 October 2014.

Wright, S., Whelan, S., Warhurst, C. and Teicher, J. (2015), *The Lucky Country? Employment upgrading in Australia in the 2000s*, draft report received 17 March 2015.

## National partners

Australia	Chris Warhurst and Sally Wright (University of Warwick) and Stephen Whelan (Workplace Research Centre, University of Sydney Business School)
Brazil	Rodrigo Rodrigues-Silveira (Ibero-American Institute and Free University Berlin)
China	Du Yang, Cheng Jie and Qu Xiaobo (Chinese Academy of Social Sciences)
India	Mehtabul Azam (Oklahoma State University and IZA)
Japan	Ryo Kambayashi (Institute of Economic Research, Hitotsubashi University)
Morocco	Mustapha Ziriouli (Haut Commissariat au Plan)
Russia	Vladimir Gimpelson and Rostislav Kapeliushnikov (Centre for Labour Market Studies, National Research University – Higher School of Economics, Moscow)
South Korea	Deok Soon Hwang (Korea Labor Institute)
US	Rachel Dwyer (Ohio State University) and Erik Olin Wright (University of Wisconsin-Madison)

Meetings of the Global Jobs Project took place in Dublin (17 May 2013), Brussels (5–6 December 2013) and Manchester (9–10 September 2014).

The authors would like to thank the following for their active participation in meetings: Damien Grimshaw and Anthony Rafferty (University of Manchester), Dominique Anxo (Centre for European Labour Studies), Emily Murphy (University of Lausanne), Terry Ward (Applica, Brussels), Robert Stehrer (Vienna Institute for International Economic Studies), Janine Berg and Sangheon Lee (International Labour Office), Robert Strauss, Erik Meyermans and Laura de Dominicis (European Commission), Marton Csillag (Budapest Institute for Policy Analysis), Rafael Muñoz de Bustillo and José-Ignacio Antón (University of Salamanca) and Anne Saint-Martin (OECD).



European Foundation for the Improvement of Living and Working Conditions

Upgrading or polarisation? Long-term and global shifts in the employment structure:  
European Jobs Monitor 2015

Luxembourg: Publications Office of the European Union, 2015

2015 - 99 pp. - 21 × 29.7 cm

ISBN 978-92-897-1380-1

doi:10.2806/473689

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*Europe has begun to emerge from the prolonged slump caused by the global financial crisis in 2008 and exacerbated by the euro zone single-currency crisis in 2010–2011. In the last year, aggregate employment levels have risen faster than at any time since 2008. This, the fourth annual European Jobs Monitor report, looks in detail at shifts in the employment structure at Member State and aggregate EU level over 2011–2014. The objective is to assess the extent to which recent shifts are polarising, arising from a decline in mid-paid jobs, or upgrading as a result of growth in high-paid jobs. The analysis finds that the most recent pattern is more downward-skewed, mainly as a result of stronger growth in less knowledge-intensive services. The report also summarises the main findings from two other analyses of labour market shifts: one centres on developments in six European countries, while the other focuses on six non-EU countries.*

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